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RESEARCH DESIGN FOR A DETOUR ROUTE FOR A NEW LOCK, ORLEANS PARISH, LOUISIANA

November 1994

FINAL REPORT

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This report presents the results of archeological and historical records review of the Meraux Tract, in St. Bernard Parish, Louisiana. The proposed project area consists of a 305 m (1,000 ft) wide corridor that extends parallel to the Guerenger Canal as well as a narrow (38.1 m [125 ft]) corridor located between the Florida Walk Canal and the Back Protection Levee. The project area encompasses approximately 79.3 ha (196 ac). The research was conducted by R. Christopher Goodwin & Associates, Inc., for the U.S. Army Corps of Engineers, New Orleans District, in association with planned improvements to the Inner Harbor Navigation Canal Lock in Orleans Parish, Louisiana. Prior to implementing the proposed construction, an overland detour route through the Meraux Tract for vehicular traffic is planned.

Although the Meraux Tract encompasses the outskirts of two plantations that figured prominently in the 1815 Battle of New Orleans, few if any cultural resources or features or cultural resources associated with plantation agriculture along the lower Mississippi River can be expected. Historic cultural resources should date only from the very recent past. In addition, few if any prehistoric archeological resources are anticipated in the project area.

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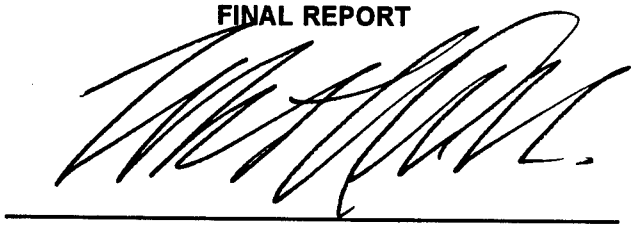

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Principal Investigator

By

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At R. Christopher Goodwin & Associates, Inc., Mr. William P. Athens served as the Principal Investigator. Mr. Stephen Hinks served as Project Manager; he was assisted by Dr. Jack Irion. Dr. Ralph Draughon and Ms. Susan Barrett Smith, B.A., conducted the historical and archival research for this report. Ms. Shirley Rambeau and Ms. Faith Leech, B.A., prepared the graphics. Mr. Daniel Dolensky, M.A., edited the report, and Ms. Christine Herman, B.A., assisted by Ms. Stacie Goeddel, B.A., and Ms. Adele Cason, produced the report.

CHAPTER I

INTRODUCTION

This report presents the results of archeological and historical records review of the Meraux Tract, in St. Bernard Parish, Louisiana (Figure 1). The proposed project area consists of a 305 m (1,000 ft) wide corridor that extends parallel to the Guerenger Canal as well as a narrow (38.1 m [125 ft]) corridor located between the Florida Walk Canal and the Back Protection Levee. The project area encompasses approximately 79.3 ha (196 ac). The research was conducted from August to October 1994 by R. Christopher Goodwin & Associates, Inc., for the U.S. Army Corps of Engineers, New Orleans District, pursuant to Delivery Order 12, Contract DACW29-92-D-0011. This project was undertaken in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

This cultural resources investigation is associated with planned improvements to the Inner Harbor Navigation Canal Lock in Orleans Parish, Louisiana, proposed by the U.S. Army Corps of Engineers, New Orleans District. These improvements include the possible replacement or renovation of the lock and bridge construction at the St. Claude Avenue and Claiborne Avenue bridges. Prior to implementing the proposed construction, an overland detour route through the Meraux Tract for vehicular traffic is planned.

A review of all relevant archeological, geological, and historical records was conducted to reconstruct the prehistoric and historical land use of the project area and to develop a context assessment of future impacts. The second phase of this project included the development of a research design to guide future compliance efforts that may be required in support of those undertakings associated with the improvement of the Inner Harbor Navigation Canal Lock.

Organization of the Report

The natural setting of the project area, including a review of the geomorphic and geologic development of the project area, is presented in Chapter II. The prehistoric setting of the project area is discussed in Chapter III. Previous archeological investigations conducted within the vicinity of the Meraux Tract are summarized in Chapter IV. The historical background of the Meraux Tract is chronicled in Chapter V; particular emphasis is placed on the potential presence of remains surviving from the 1815 Battle of New Orleans. A research design to guide future investigations and management recommendations are presented in Chapter VI. Although historical and geomorphological research suggests that the potential for encountering prehistoric or historical cultural properties in the project area is low, archeological survey or reconnaissance is recommended to test this hypothesis. The Scope of Work is provided in Appendix I.

Figure 1. Excerpts from the 1966 (photorevised 1972 and 1979) USGS 7.5' series topographic quadrangle, New Orleans East, Louisiana, and the 1967 (photorevised 1972 and 1979) USGS 7.5' series topographic quadrangle, Chalmette, Louisiana, depicting the Meraux Tract project area.

CHAPTER II

NATURAL SETTING

The proposed project area lies along the east (left descending) bank of the Mississippi River in western St. Bernard Parish, Louisiana, in an area that comprises the outer margin of Mississippi River natural levee deposits and former freshwater backswamp. An understanding of the natural setting of the Meraux Tract project area is critical in comprehending the potential of the project area to contain intact prehistoric and/or historic cultural deposits. The following review includes a discussion of the physiography, regional geomorphology, geology, terranes, and paleogeography of the project area. Historic flora and fauna common to the project area vicinity and a summary of the climate also are included.

Physiography

The project area lies in the Mississippi Delta Plain of the Holocene deltaic plain physiographic region as defined by Hunt (1974). The Mississippi Delta Plain is a complicated geomorphic surface formed by the periodic progradation of delta complexes of the Mississippi and Red rivers over the past 9,000 years (Frazier 1967; Penland et al. 1987). This surface consists of numerous coalesced or partially buried delta plains that represent the surfaces of individual delta complexes. The surface of each of these delta plains typically exhibits the classic radiating pattern of relict deltaic distributaries described by Kolb and Van Lopik (1966) and mapped by Saucier and Snead (1989) and Snead and McCulloh (1984).

The project area lies in the St. Bernard Coastal Region (Goodwin et al. 1991:Figure 1). This region consists of the partially submerged and slowly subsiding delta plains of the St. Bernard (Metairie-La Loutre) Delta Complex. The delta plains consist of eastwardly radiating bayous and natural levee ridges that represent the abandoned distributary systems of the inactive delta complex (Treadwell 1955:Figures 1 and 2). The portions of the deltaic plain located next to the Mississippi River have been modified by the lateral migration of its channels and by the formation of its levees (Kolb and Saucier 1982:80; Kolb and Van Lopik 1966:27-33).

Urban development, however, has modified the physiography of the entire project area. The inland swamps that formerly occupied the project area have been drained (Kolb and Saucier 1982:Figures 6 and 7; U.S. Geological Survey 1891, 1950, 1979).

In summary, the Meraux Tract project area consists of Mississippi River natural levee deposits and adjacent former inland swamp; these deposits were formed during progradation of the St. Bernard Delta Complex. Overall, the surface deposits have been disturbed extensively or destroyed by modern urban development associated with the growth of greater New Orleans. The geomorphological processes that influenced the natural formation of the project area are discussed below.

Geomorphology

The delta plains that constitute the St. Bernard Coastal Region are geomorphic surfaces constructed by the aggradation of deltaic sediments. When a delta complex progrades into the gulf, a thick sequence of progradational deposits accumulates (Figure 2). Initially, clay is deposited from suspension to form a thick blanket of unfossiliferous, parallel-laminated, and fine-grained sediments called prodelta facies. As the delta moves seaward, the prodelta facies become siltier and parallel, and lenticular laminea of silt appear and increase in abundance. With continued progradation, the accumulating progradational

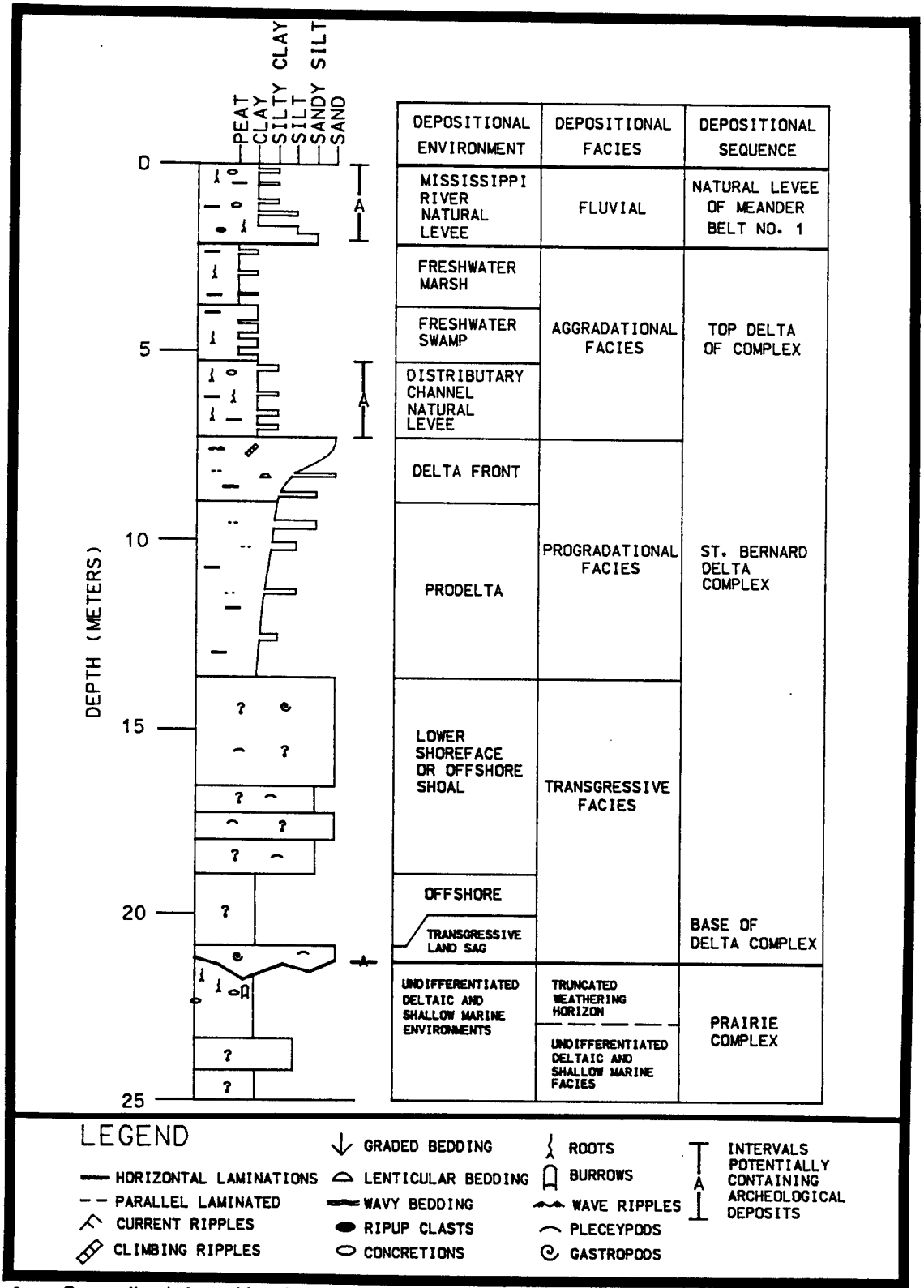

Figure 2. Generalized depositional sequences in the project area. Constructed from data by Coleman (1982), Kolb (1962), Kolb and Van Lopik (1966), Penland (1990), and Rodriguez (1927).

deposits consist of laminated silts and clays with thin sand layers called delta front facies. The uppermost portion of these delta front facies forms as a bar at the mouth of the associated distributary. The bars consist of interbedded silts and silty sands that display a wide variety of sedimentary structures associated with currents and waves.

The accumulation of natural levee and marsh sediments on the submarine progradational deposits results in the formation of the subaerial delta plain of the delta complex. The deposition of sediment by floodwaters forms parallel low ridges bordering the distributary channel. Through breaks in the natural levees, floodwaters form crevasse splays that extend onto the adjacent delta plain and subdeltas that in turn extend into and fill the adjacent interdistributary bays. These sediments also are included in the "interdistributary facies" defined by Kolb (1962:41-44) and Britsch and Dunbar (1990:22-23). The natural levee and crevasse splay deposits consist of silts, sandy silts, silty sands, and very fine sands that are characteristically small-scale, cross-laminated, and rippled with intensively bioturbated zones. These sediments commonly are oxidized and contain abundant digenetic materials such as iron sesquoxide, carbonate nodules, and cements. Organic marsh deposits accumulate in the periodically flooded land away from the main distributaries (Coleman 1982:52).

Eventually, long-term delta lobe progradation leads to an overextension of the distributary network and to a decrease in hydraulic efficiency. With time, the decrease in hydraulic efficiency causes an upstream diversion of the trunk channel, resulting in a switch to a shorter, more efficient course with a steeper gradient. This switch generates another delta complex at the end of this new river channel (Fisk 1960).

With the sediment needed to maintain the abandoned delta complex diverted to building a new delta, tectonic and compactional subsidence and eustatic sea level rise cause the old delta plain to sink beneath the Gulf of Mexico. As the delta sinks, marine processes rework the surface of the delta complex, forming an erosional surface and transgressive sands that form the basal disconformity and basal deposits of a new depositional sequence. When a delta lobe progrades over this area, these deposits become part of a new delta complex (Penland et al. 1987).

Fluvial Complex

The meandering of the Mississippi River in the Mississippi Delta Plain has created a narrow meander belt. This meander belt represents the surface of a basic allostratigraphic unit, informally called a fluvial complex. A fluvial complex consists of a sequence of fluvial deposits bounded by a basal erosional surface and the upper constructional geomorphic surface of the meander belt. Typically, the basal bounding discontinuity is an erosional unconformity formed by scour at the channel bottom and by the bank collapse of a channel cutbank (Autin 1989). Fluvial sediments deposited by this channel overlie the basal unconformity. Generally, these sediments consist of a lower part composed of point bar sands and gravels, overlain by finer-grained and vertically accreted natural levee and overbank sediments (Walker 1984). The upper bounding discontinuity is formed by the meander belt. If later fluvial erosion truncates and buries the upper portion of a fluvial complex, the upper bounding discontinuity will consist of an erosional surface (Goodwin et al. 1991:22-24).

The lateral migration of the Mississippi River in the New Orleans area created a meander belt that measures from 1 to 1.8 km (0.6 to 1 mi) in width. As the channel laterally migrated, its cutbank eroded the Holocene deltaic deposits and underlying Pleistocene sediments to depths of 35 to 40 m (115 to 131 ft) below sea level. The laterally migrating channel simultaneously backfilled the opposite bank with coarse-grained point bar sediments to form this narrow meander belt. Natural levee deposits from the Mississippi River have buried the deltaic plain adjacent to the meander belt and its point bar deposits. The age, origin, and stratigraphy of the meander belt sediments contrast sharply with the sediments forming the

adjacent delta plain (Figure 3). Because of the restricted meandering of the channel, the meander belt in the New Orleans area lacks abandoned meander loops and oxbow lakes normally associated with meander belts (Kolb 1962:Plate 5 and 6; Kolb and Saucier 1982:80).

Relative to upstream reaches of the Mississippi River, the reach of the Mississippi River in the New Orleans area has an unusually narrow meander belt and extremely low rates of lateral migration. The narrow meander belt partially reflects the geologically short length of time that the Mississippi River has had to develop its meander belt. Also, along the stretch of the Mississippi River located from College Point (River Mile [R.M.] 160) to R.M. 80, the meander belt of the Mississippi River is carved into overconsolidated, durable, clayey Pleistocene sediments, e.g., Figure 3. These sediments form a natural revetment, limiting local migration. South of R.M. 80, channel migration is limited by the cohesive prodelta and delta front clays that form its banks (Kolb 1962:50-51, 1963:231-232).

Geology

New Orleans and southeastern Louisiana lie directly on the surface of a very thick wedge of sand, silts, and clays formed by sediment supplied by the ancient Mississippi River. This wedge consists of approximately 12,000 m (39,400 ft) of alternating Neogene fluvial, deltaic, and marine deposits. These sediments represent the accumulation of hundreds of transgressive-regressive depositional sequences; the St. Bernard Delta Complex is one of the latest of these depositional sequences. The uppermost 640 m (2,100 ft) of this clastic wedge consists of sediments that have accumulated during the Pleistocene epoch; the upper 10 to 30 m (32.8 to 98.4 ft) of sediments have accumulated during the last 10,000 years (Kolb and Saucier 1982:77-80).

Three well-defined complexes can be recognized in the project area (Figure 4). The youngest of these allostratigraphic units is the fluvial complex associated with Meander Belt No. 1 of the Mississippi River. The formation of Meander Belt No. 1 has either partially buried or removed by erosion the Holocene deltaic sediments of the next most recent depositional complex, the St. Bernard Delta Complex. The sediments of the St. Bernard Delta Complex completely bury the third allostratigraphic unit, the Prairie Complex as defined by Autin et al. (1991:556-559).

Meander Belt No. 1 is the surface of an unnamed fluvial complex consisting of point bar and natural levee deposits of the Mississippi River (Figures 3 and 4). Generally, the fluvial sediments that form this complex consist of point bar sands that measure 35 to 45 m (115 to 148 ft) in thickness. Silty natural levee deposits as much as 6 m (20 ft) thick cover these point bar deposits and form the surface of Meander Belt No. 1. Bordering the meander belt, a wedge-shaped body of natural levee deposits extends approximately 1 to 2 km (0.6 to 1.2 mi) away from the cutbanks of the Mississippi River across the adjacent delta plain (Figure 4). In the project area, the natural levee sediments laterally lap onto clayey inland swamp deposits and the surface of the adjacent St. Bernard Delta Plain. Radiocarbon dates, ranging from 1000 - 1450 years before present (B.P.), from peats recovered at the base of natural levees and wood from the natural levees demonstrate that this segment of Meander Belt No. 1 is less than 1,200 years old (Kolb 1962; Kolb et al. 1975; Kolb and Saucier 1982; Saucier 1963).

In the project area, the St. Bernard Delta Complex consists of a depositional sequence that measures approximately 17 to 22 m (56 to 72 ft) in thickness (Figure 4). This depositional sequence consists of a basal 7 to 9 m (23 to 30 ft) of transgressive deposits overlain by 8 to 9 m (26 to 30 ft) of progradational deposits. About 2 to 4 m (6 to 13 ft) of aggradational swamp and marsh deposits cap the progradational deposits and form the surface of the St. Bernard Delta Complex. The transgressive deposits appear to consist of a complex assemblage of shallow marine and nearshore sands, silty sands, sandy clays, clays, and silts that contain varying proportions of shell. The progradational deposits consist of a

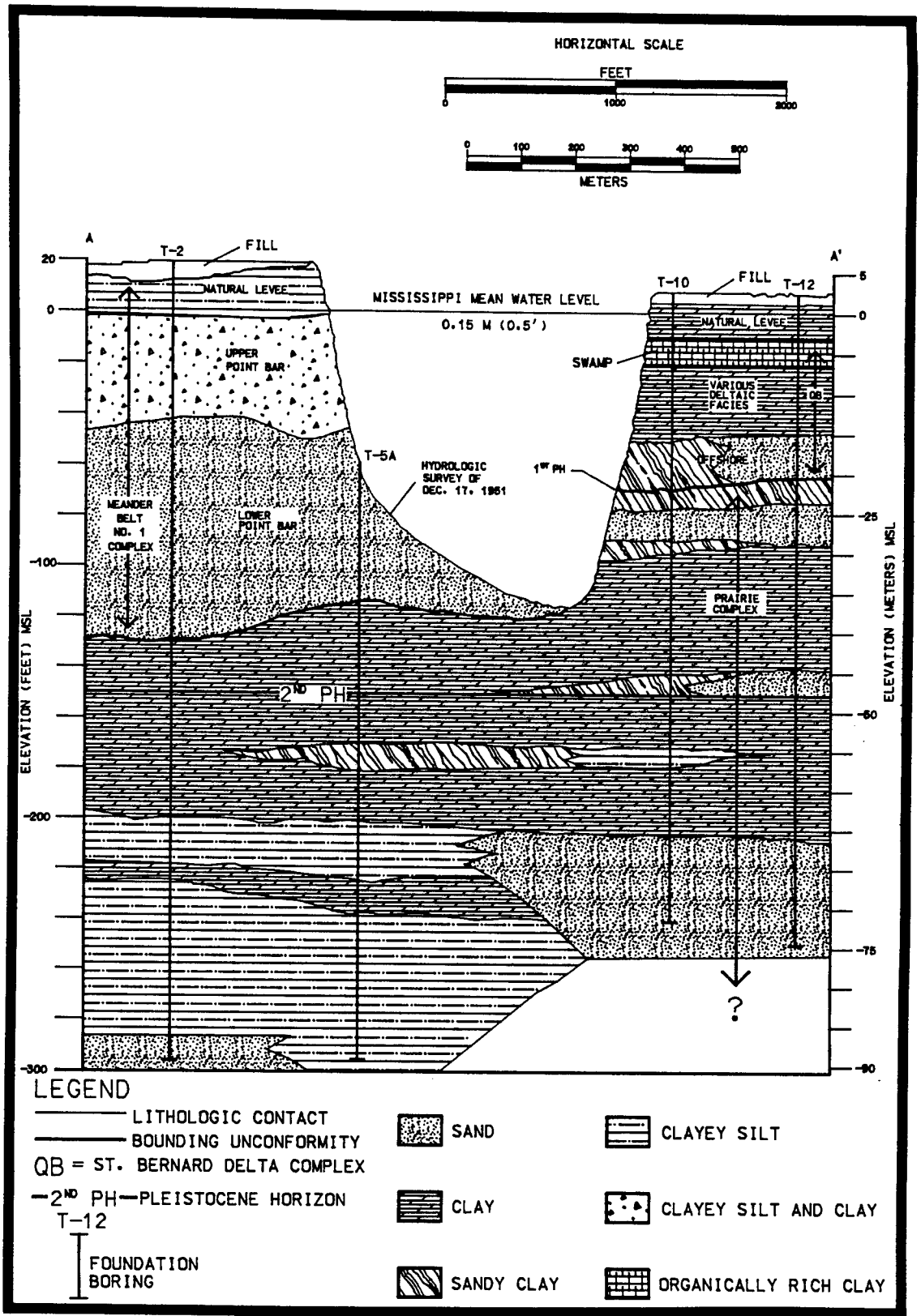

Figure 3. Cross-section of the Mississippi River Meander Belt No. 1 near the Meraux project area, showing stratigraphic relationships of different complexes (modified from Kolb [1962: Plate 27]).

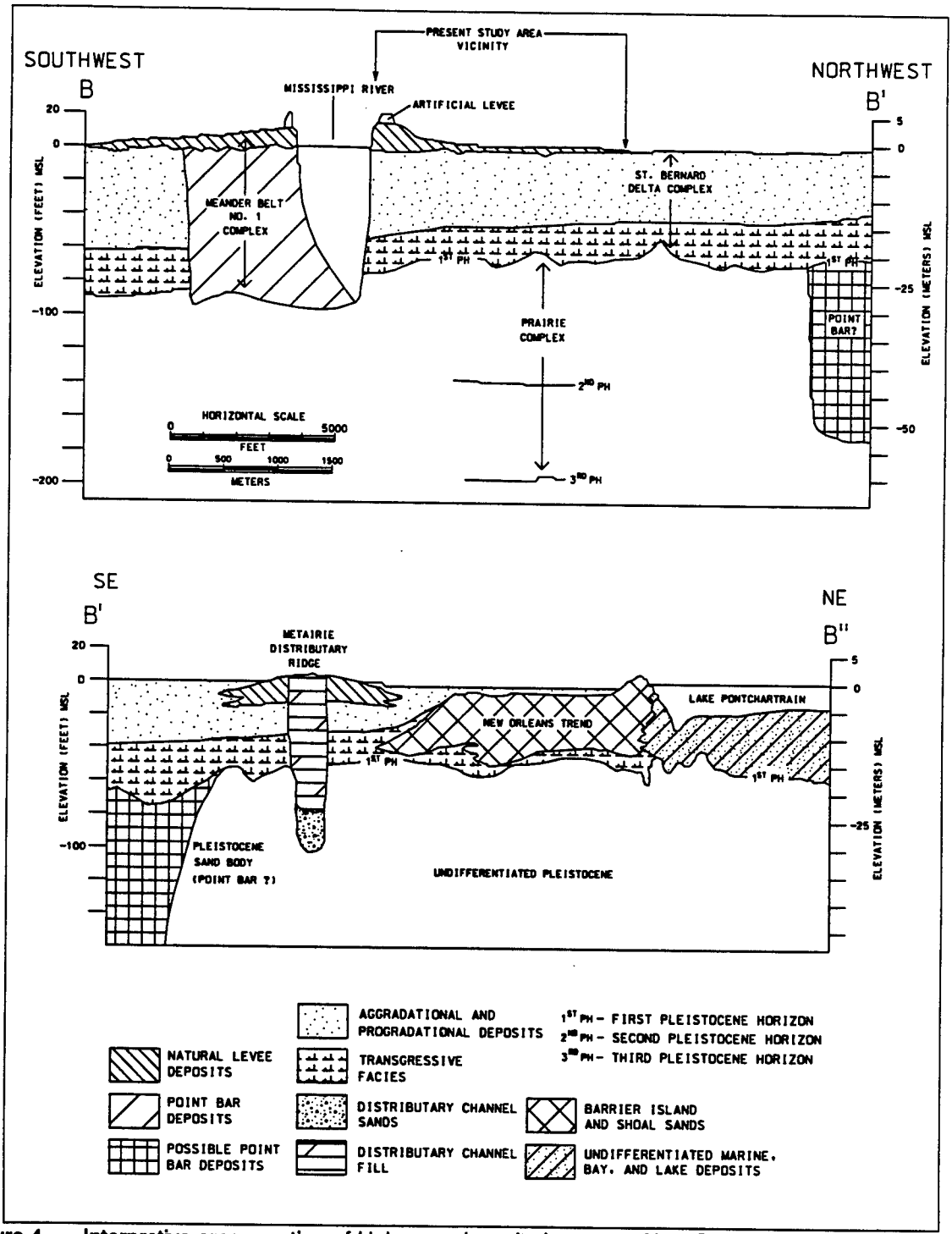

Figure 4. Interpretive cross-section of Holocene deposits in eastern New Orleans. Based on data from Kolb (1962), Kolb et al. (1975: Plates 21 and 22), Kolb and Saucier (1982), Otvos (1973, 1978), and Saucier (1963, 1977).

variety of typical prodelta, delta front, distributary mouth bar, and interdistributary sediments that cannot be differentiated with the available data. The 2 to 3 m (6 to 10 ft) thick layer of peaty, organically rich, clayey swamp and marsh deposits constitutes the uppermost, aggradational portion of the St. Bernard Delta Complex. To the north, these sediments partially bury and partially interfinger with natural levee deposits of the Metairie Ridge. Its channel has removed the deltaic deposits underlying this relict distributary ridge (Kolb 1962; Kolb et al. 1975; Kolb and Saucier 1982; Saucier 1963).

Various studies have demonstrated that the delta plain of the St. Bernard Delta Complex is sinking relative to sea level at a culturally significant rate. For example, Ramsey and Moslow (1987:1685) estimated from tidal gauge data that relative sea level rise in the New Orleans area ranged from 0.5 to over 1 cm (0.2 to over 0.4 in) per year from 1962 to 1982. However, this rate includes extreme subsidence caused by artificial dewatering and oxidation of the organic matter in the deltaic sediments (Kolb and Saucier 1982:90). Regional rates of 12 cm (5 in) per century determined by Saucier (1963:14) and 24 cm (9 in) per century determined by Kolb and Van Lopik (1958) likely are more accurate estimates of delta plain subsidence.

Two, possibly three, depositional sequences and unnamed alloformations belonging to the Prairie Complex directly underlie the St. Bernard Delta Complex. In the New Orleans area, these depositional sequences and allostratigraphic units consist of indistinguishable and heterogeneous assemblages of deltaic, shallow marine, and strandline deposits. Possible point bar deposits occur in the uppermost Pleistocene depositional sequence (Figure 4). The uppermost depositional sequence is presumed to be of Middle Wisconsinan age but could be Sangamonian in age. Miller (1983:95) has obtained a date of 31,270 B.P. ±370 years from wood recovered from deltaic deposits of the uppermost depositional sequence. North of Lake Pontchartrain, the exposed surfaces of two of these depositional sequences form the coast-parallel Prairie Terrace as mapped by Saucier and Snead (1989) (Autin et al. 1991:556-559; Kolb et al. 1975; Saucier 1977:10-13).

The depositional sequences present in the Pleistocene deposits are defined by the occurrence of well-defined, often erosionally truncated, weathering horizons. In the project area, the top of the Prairie Complex is marked by a well-developed weathering horizon that occurs at an approximate depth of 18 to 22 m (59 to 72 ft) below sea level (Figure 4). This weathering horizon, called the First Pleistocene Horizon by Kolb et al. (1975:4), is distinguished from overlying Holocene material by a mottled orange, tan, or greenish gray color, an abrupt decrease in water content, an increase in stiffness and shear strength, and the presence of pedogenic calcareous nodules. Additional weathering horizons have been penetrated by borings at depths of 40 to 70 m (131 to 230 ft) below sea level in the project area. Each of these weathering horizons is associated with significant unconformities that form the bounding discontinuities of unnamed alloformations. Unfortunately, because of a lack of data it is unknown if the weathering horizon at a depth of 70 m (230 ft) below sea level represents the IG-2 paleosol as defined by Autin et al. (1991:Figure 4); the IG-2 paleosol determines the upper surface of the deposits on which the Prairie Complex rests (Kolb et al. 1975; Saucier 1977:10-13).

The geology of the surrounding area strongly influences the potential for encountering prehistoric archeological deposits in the Meraux Tract project area. Any Paleo-Indian or Early Archaic cultural resources in the project area would be situated near the top of the Prairie Complex, approximately 18 to 22 m (59 to 72 ft) below modern sea level. Rising sea levels inundated the region during the Middle and Late Archaic periods, preventing formation of any sites at that time. The subsequent progradation of the St. Bernard Delta Complex, approximately 3400 - 1600 B.P., covered the inundated Prairie Complex and developed the project area vicinity. This, in turn, has been modified and partially covered by Meander Belt No. 1, which remains active to the present (Goodwin et al. 1991). Only the subaerial natural levee deposits of the St. Bernard Delta Complex and Meander Belt No. 1 have a potential for containing buried archeological deposits dating from the Neo-Indian stage. Therefore, buried archeological deposits will be

restricted to three narrow stratigraphic intervals in the sedimentary sequences that underlie the project area (Figure 2).

Geomorphic Terranes

Numerous sedimentological and geomorphological studies of the Mississippi River Delta have demonstrated a direct association between constructional landforms and the sedimentary facies that form them. These studies document that the distribution of deltaic landforms, and often their soils, in a delta plain is related directly to the subsurface distribution of a specific depositional facies in the shallow subsurface (Coleman 1982; Fisk 1960; Kolb and Van Lopik 1966). The three-dimensional distribution of different deltaic sediments in the near subsurface can be mapped from the distribution of landforms and soils because a restricted range of sediment types characterize each depositional facies. In addition, the archeological potential of these deposits can be determined from terrane mapping because depositional facies can be correlated directly with specific depositional environments.

The terrane is the basic unit for mapping the subsurface distribution of geologic materials on the basis of associated landforms (Berg et al. 1984). By definition, a terrane is a mappable portion of land surface that exhibits a distinctive assemblage of landforms that are underlain by specific sedimentary facies. The project area crosses the natural levee and inland swamp terranes. Point bars, natural levees, abandoned distributaries, and inland swamp terranes occur next to the project area. Point bars and abandoned distributary terranes are not discussed because they lie outside the project area; however, Britsch and Dunbar (1990), Coleman (1982), Kolb (1962), and Kolb and Van Lopik (1966) discuss the characteristics of these terranes.

Natural Levee Terrane

The natural levee terrane consists of the natural levees that border the active meander belt of the Mississippi River and the relict trunk distributary ridge of the Bayou Sauvage distributary called the Metairie Ridge (Figure 4). The natural levees of the inactive Bayou Sauvage distributary form an integral portion of the St. Bernard Delta Plain and Complex. By contrast, the natural levees of the Mississippi River have buried the surface of the St. Bernard Delta Plain (Kolb 1962; Kolb et. al 1975).

The project area crosses the natural levee terrane that consists of the natural levee of the Mississippi River. This natural levee is a wedge-shaped body of sediments associated with the adjacent fluvial complex resting on the delta plain and sediments of the St. Bernard Delta Complex (Figure 4). Next to the Mississippi River, the natural levee deposits measure 3 to 4.5 m (10 to 15 ft) in thickness and form a ridge over 3 m (10 ft) high. Deposits in the project area extend as far as 2.2 km (1.4 mi) away from the cutbank of the Mississippi River before they completely grade into contemporaneous deposits of the inland swamp (Kolb et al. 1975:Section G-G). Prior to construction of the artificial levees, seasonal flooding formed the natural levees that stretch along the Mississippi River. The details concerning the fluvial processes that form natural levees are documented and discussed by Farrell (1987) and Fisk (1947).

Detailed data concerning the lithology of the sediments forming the natural levee of the New Orleans area have not been published. Typically, such natural levees consist predominantly of interbedded silt, clayey silt, and clay with minor amounts of silty sand. The proportion of clay in the natural levee deposits increases with the distance from the associated bank of the Mississippi River. Generally, these sediments have been altered intensively by bioturbation and intense pedogenesis as a result of subaerial exposure. Thus, the upper portions of these deposits generally are massive, have a reddish brown to brown color, contain iron sesquoxide and carbonate nodules, have low water contents, and are stiff to very

stiff in consistency. The older, now deeply buried natural levee deposits have been affected less by pedogenesis. As a result, they have grayish colors and layers that retain their original sedimentary structures. When preserved, these structures include a variety of climbing ripples and exhibit small-scale cross lamination (Britsch and Dunbar 1990:13 and 19; Kolb 1962:27-40; Kolb and Van Lopik 1966:27-29).

The natural levee is characterized by the Sharkey-Commerce soil association. This soil association consists of the Commerce silt loam, Commerce silty clay loam, Sharkey silty clay loam, and Sharkey clay. This soil association is typical of the actively aggrading natural levees of the Mississippi River. The southern one-quarter of the project area is mapped as Sharkey silty clay loam (Figure 5) (Trahan et al. 1989: Plate 19).

Sharkey silty clay loam and clay both are poorly drained, slightly acid to neutral inceptisols developed in distal natural levee deposits. The clayey nature of the Sharkey soils reflects the clayey character of distal natural levee deposits and characterizes the intermediate slopes of the natural levees. Sharkey clay is the dominant soil in the lowermost, distal portions of the natural levee (Figure 5). Both soils are characterized by 90 to 150 cm (35 to 59 in) thick sola with an A-Bg-BCg-Cg horizon sequence and, typically, are developed in either a silty clay loam or clay surface layer overlying a clay surface layer (Trahan et al. 1989).

Inland Swamp Terrane

The northern three-quarters of the project area includes the former freshwater swamps of the inland swamp terrane. The inland swamp occupies a low portion of the deltaic plain between the natural levees of the Mississippi River and the Metairie Ridge, an abandoned trunk distributary of the St. Bernard Delta Complex. To the west, this inland swamp grades laterally into fresh and brackish marsh (Britsch and Dunbar 1990:21).

Prior to construction of the artificial levees, seasonal floods by the Mississippi River regularly provided the inland swamps and natural levees with fresh water. The floods carried substantial amounts of fine-grained, clayey sediments into the inland swamps, and these sediments quickly settled out of suspension to form thick beds of often organically rich clay. These inland swamp deposits represent fluvial sediments associated with Meander Belt No. 1. These sediments have buried the surface of the St. Bernard Delta Complex (Britsch and Dunbar 1990:21; Saucier 1963:86-92).

The deposits underlying the inland swamp consist primarily of organic clay. These sediments are typically stiff, massive clays containing some wood and pyritized roots. Frequently, these clays contain layers of peat and undecayed wood. The proximity to either an active river channel or deltaic distributary determines overall organic content, which apparently increases with distance from an active channel. Because these inland swamps generally lie close to active channels, their sediments typically contain less than 30 percent organic material (Britsch and Dunbar 1990:21).

The inland swamp terrane in the project area is mapped as Harahan and Westwego clay (Figure 5). Undisturbed, the Harahan clay is a very poorly drained inceptisol associated with freshwater swamps that occur in the interdistributary areas bordering the Mississippi River. Harahan clay typically consists of a 50 to 100 cm (20 to 39 in) thick A-Bg-Cg horizon sequence developed entirely in overbank clays. Commonly, a gleyed and buried A horizon, specifically an Abg horizon consisting of either mucky clay, silty clay, or clay, occurs between the Bg and Cg horizons. Westwego soils occupy a slightly lower position than Harahan soils and are found in broad, drained former swamps of the Mississippi Delta (Trahan et al. 1989).

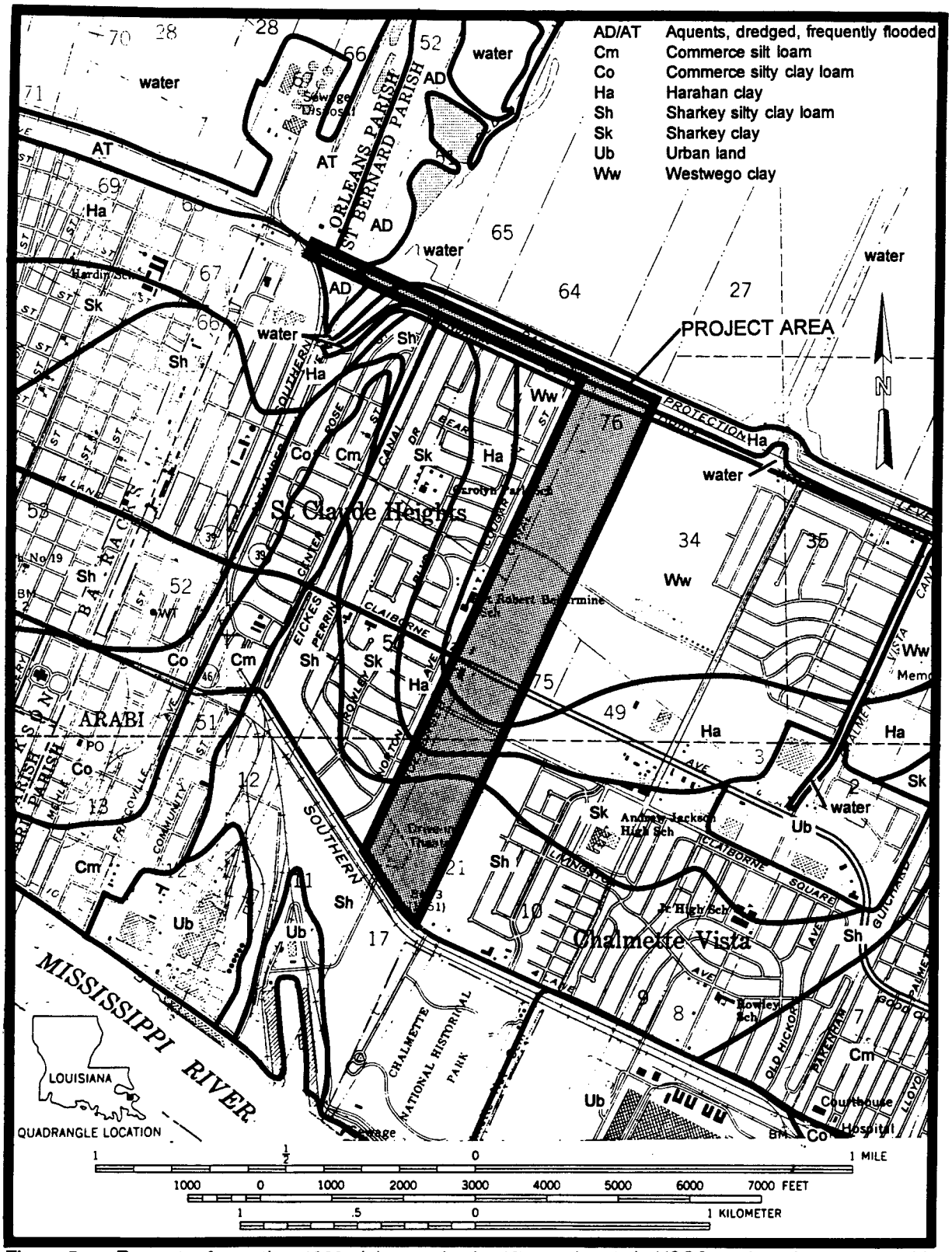

Figure 5. Excerpts from the 1966 (photorevised 1972 and 1979) USGS 7.5' series topographic quadrangle, New Orleans East, Louisiana, and the 1967 (photorevised 1972 and 1979) USGS 7.5' series topographic quadrangle, Chalmette, Louisiana, depicting the Meraux Tract project area, surrounding areas, and the project area soil types (modified from Trahan 1989 and Trahan et al. 1989).

Paleogeography

During the Late Pleistocene, from 132,000 - 10,000 B.P., the accumulation and dissolution of continental ice sheets caused eustatic sea level to fluctuate 20 to 70 m (66 to 230 ft) below present sea level. This fluctuation occurred in 20,000 year cycles. Maximum high sea level stands occurred at approximately 120,000 year intervals during interglacial periods such as the Holocene epoch and the early Sangamonian stage. As a result, the paleogeography of southeastern Louisiana changed as the shoreline migrated north and south across the southeast Louisiana continental shelf and coastal plain. The Sangamonian high sea level stand reached an elevation of 6 to 7 m (20 to 23 ft) above present sea level around 120,000 B.P. during Oxygen Isotope Stage 5E. The northern portion of the coast-parallel Prairie Terrace probably was an active series of coalesced alluvial plains at this time (Autin et al. 1991:556-558; Moore 1982; Suter et al. 1987).

Wisconsinan Stage

During the Late Wisconsinan stage, the 20,000 year cycle of eustatic sea level fluctuation created a series of depositional sequences. The fall in sea level resulted in an expansion of the coastal plain onto the modern continental shelf and the accumulation of thin, laterally extensive deposits of shelf-phase deltas and, eventually, thick fluvial deposits. At maximum low stand, the dropping of sea level below the shelf edge caused entrenchment of the shelf by fluvial systems, subaerial exposure of the shelf, and deposition of thick shelf-margin deltas at the shelf edge. When sea level rose, the ensuing transgression submerged, eroded, reworked, and redistributed fluvial and deltaic deposits as broad sand sheets and shoals. As the rise in sea level ceased or slowed, fluvial systems, delivering abundant supplies of sediment to the coast, built deltaic complexes that prograded seaward onto the shelf (Coleman and Roberts 1988; Suter et al. 1987).

Each cycle of eustatic sea level fluctuation created a depositional sequence of fluvial, deltaic, estuarine, and marine sediments separated either by exposure surfaces or erosional unconformities. As a result, the repeated fluctuations of sea level left an accumulation of sediments consisting of multiple depositional sequences that form the modern continental shelf and coastal plain of Louisiana (Coleman and Roberts 1988; Suter et al. 1987). The two upper sequences of Pleistocene sediments that underlie the New Orleans area appear to represent depositional sequences deposited between 120,000 - 21,000 B.P. (Autin et al. 1991:558; Saucier 1977:10-13).

Around 21,000 B.P., at the start of the Late Wisconsinan, relative sea level dropped from the highest Middle Wisconsinan high stand of 20 m (66 ft) below present sea level to its maximum Late Pleistocene low stand at about 120 m (394 ft) below present sea level. In response, the shoreline moved to the modern shelf edge, subaerially exposing large areas of the continental shelf. Surficial weathering at this time formed the First Pleistocene Horizon, a truncated weathering horizon (Kolb et al. 1975:4). The Mississippi River and its tributaries responded by partially re-entrenching the Mississippi River valley by 25 to 30 m (82 to 98 ft). Similarly, the major streams in the New Orleans area entrenched their valleys by 6 to 9 m (20 to 30 ft) (Kolb et al. 1975:Plate 2; Saucier 1963:Figure 14, 1977:10-13; Suter et al. 1987).

During the latter part of the Late Wisconsinan, relative sea level rose episodically from approximately 120 m (394 ft) below modern sea level to 30 m (98 ft) below modern sea level by 10,000 B.P. A wide, deeply cut erosional terrace along the edge of the outer continental shelf records a sea level still stand about 80 to 90 m (262 to 295 ft) below modern sea level. In addition, during a still stand between 9200 and 8200 B.P., the Outer Shoal Delta Complex, whose delta plain currently lies at depths of 15 to 25 m (49 to 82 ft) below sea level, might have formed (Frazier 1974; Goodwin et al. 1991:36).

Holocene Epoch

As the Late Wisconsinan-Holocene sea level rise submerged the modern Louisiana continental shelf, the transgressing shoreline substantially modified its surface. The degree of transgressive erosion varied from the minor removal of overbank deposits from natural levees to the complete erosion of the alluvial plains in coast-parallel terraces. During still stands, local accumulations of lagoonal, chenier, or other aggradational coastal plain deposits may have buried the coastal plain deep enough to have protected it from transgressive erosion (Pearson et al. 1986:224-245; Suter et al. 1987).

In addition, shelf and transgressive shoreface processes substantially modified both strandlines and deltas. Shoreface erosion deeply eroded the surfaces of Late Wisconsinan and Early to Middle Holocene deltas, forming extensive ravinement surfaces. Shelf and sound processes eroded and redistributed the upper parts of many barrier islands, cheniers, and deltas into marine sheet sands and east-west oriented sand shoals. Although three or four of these offshore sand ridge trends represent the remains of drowned strandlines, the original barrier islands and beach deposits have been reworked almost totally into marine sand shoals. During this time, the entrenched valleys of the Mississippi River and local streams were filled with fluvial, estuarine, and sometimes lagoonal sediments (Frazier 1974:19-24; Penland et al. 1985, 1987; Suter et al. 1987:210-214).

From about 7500 - 5500 B.P., a still stand occurred during an otherwise rapid rise in sea level at a depth of 5 to 6 m (16 to 20 ft) below present. During this still stand, the Mississippi River apparently built the Maringouin Delta Complex around 7300 - 6200 B.P. (Frazier 1967, 1974). Frazier (1967:269) noted the presence of two stacked depositional sequences in this delta complex.

As sea level rose, the Gulf of Mexico flooded the Late Wisconsinan eastern Louisiana coastal plain. By 5000 B.P., the shoreline reached the edge of the modern Prairie Terraces forming the Pontchartrain embayment. Between 5100 - 4000 B.P., longshore currents created and maintained a chain of barrier islands and shoals that extended southwest across the embayment from the mouth of the Pearl River. This chain of shoals and scattered islands, called the "New Orleans Trend," created the gulfward boundary of the ancient Pontchartrain Bay (Figure 6). By about 5000 B.P., rising sea level also flooded the Mississippi Alluvial Valley and created a brackish water embayment that extended to the latitude of Baton Rouge (Otvos 1978; Saucier 1963:44-46).

The renewed rise in sea level to the west submerged most of the surface of the Maringouin Delta Complex. The development of the Teche Delta Complex began around 5,800 years ago after the rising sea level submerged most of the Maringouin Delta Complex. The Mississippi River built the Teche Delta Complex over the Maringouin Delta Complex between 5800 - 3900 B.P. (Figure 6) (Frazier 1967; Weinstein and Gagliano 1985:120-123).

The Mississippi River began to shift its course from Meander Belt No. 3 to Meander Belt No. 2 near Marksville, Louisiana, approximately 4800 B.P. This diverted much of its flow down the eastern and central part of the Mississippi Alluvial Valley (Autin et al. 1991). As a result, a new delta complex called the "early St. Bernard Delta Complex" by Frazier (1967) and the "Metairie Delta Complex" by Weinstein and Gagliano (1985:122-123) prograded into and through the New Orleans area. The main delta of this complex prograded about 70 km (43 mi) southeast of New Orleans into the Gulf of Mexico. By 4000 B.P., another small delta of this complex prograded northeast and buried a chain of southwest trending barrier islands, the New Orleans Barrier Island Trend. The New Orleans Trend shifted slightly east to form the Bayou Sauvage Trend of shoals and barrier islands. The burial of the New Orleans Trend by deltaic deposits transformed Pontchartrain Bay into a brackish water bay, ancestral to Lake Pontchartrain (Otvos 1973: 31-33; 1978:Figure 16; Saucier 1963:56-59).

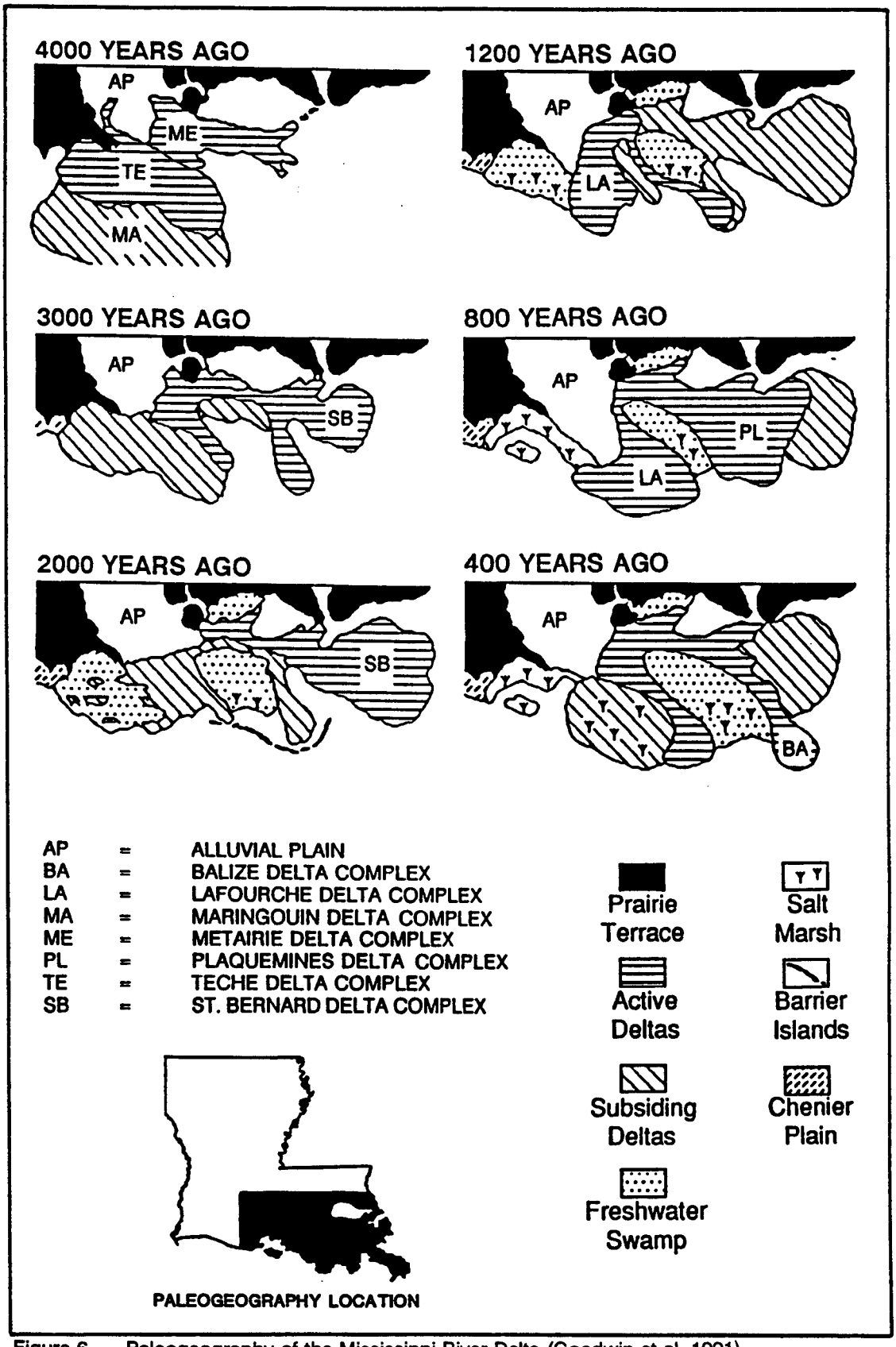

Figure 6. Paleogeography of the Mississippi River Delta (Goodwin et al. 1991).

The Metairie Delta Complex developed into the La Loutre Delta Complex (Weinstein and Gagliano 1985:123) or the St. Bernard Delta Complex (Frazier 1967) from about 3400 - 1600 B.P. This delta complex formed two major delta lobes that prograded from the New Orleans area (Figure 6). The larger delta, La Loutre Delta, prograded eastward to form most of St. Bernard Parish. By 3000 B.P., this delta lobe buried the New Orleans Trend, creating Lake Pontchartrain. A smaller delta, the Des Familles Delta, prograded southward from the New Orleans region. From 1800 - 600 B.P., only the Bayou Sauvage delta of the St. Bernard Delta Complex remained active.

Lopez (1991) proposed that Lake Pontchartrain formed as a principle result of Holocene activity along a fault zone near the center of Lake Pontchartrain. His model indicates that the area in Lake Pontchartrain initially was filled by deltaic deposits of the St. Bernard Delta Complex. After formation of the St. Bernard Delta Complex, faulting down the center of Lake Pontchartrain opened an initial body of water that was later expanded by shoreline erosion. However, this model is inconsistent with (1) the general absence of Holocene deltaic deposits on the bottom of Lake Pontchartrain; (2) the lack of significant displacement of the First Pleistocene Horizon and only 4.5 m (15 ft) of displacement of the Second Pleistocene Horizon by the faulting in Lake Pontchartrain; and (3) the occurrence of over 15 m (49 ft) of displacement along the fault forming the edge of the Prairie Terrace and the northern lake shore (Kolb and Saucier 1982:Figure 4; Saucier 1963, 1977:Figure 3; Kolb et al. 1975). At this time, the available data fail to support the Lopez (1991) model.

Bayou Lafourche slowly prograded southward from the New Orleans region between 4800 - 2000 B.P. (Figure 6) and reached Thibodaux by the end of this period. Between 3500 - 2000 B.P., some flow continued to be diverted down Bayou Lafourche, extending it slowly southward and building the Terrebonne and Lafourche delta lobes (Weinstein and Gagliano 1985:123). The distributaries of the Terrebonne Delta Complex probably reoccupied relict distributaries of the former Teche Delta Complex. The Lafourche Delta Complex reached its peak discharge by 2000 B.P.

By about 1000 B.P., the discharge through the Lafourche Delta Complex began to wane as the discharge of the Mississippi River reoccupied the St. Bernard/La Loutre Delta Complex. Flow through the Terrebonne Delta stopped, and active progradation of that delta ceased. Since then, the Terrebonne Parish region has continued to subside and deteriorate. Bayou Lafourche remained an active distributary of the Mississippi River until 1904 when authorities closed the bayou (Weinstein and Gagliano 1985:144).

About 1000 B.P., the relict feeder channel of the St. Bernard (La Loutre) Delta Complex was partially reoccupied, and a delta of the Plaquemines Delta Complex prograded through the interlobe basin between the Des Familles and La Loutre deltas of the St. Bernard Delta Complex. Initially, the discharge flowed through a series of channels in this basin, such as the River aux Chenes, Belair, and Bayou Grande Cheniere. By approximately 600 B.P., the Bayou Grande Cheniere became the modern course of the lower Mississippi River. As the shoalwater Plaquemines Delta Complex prograded off the shelf edge, the shelf-margin Balize Delta formed (Weinstein and Gagliano 1985:125, 143).

The geological history of the Meraux area restricts the temporal range and distribution of archeological deposits. Before 7000 to 6000 radiocarbon years B.P., the Meraux Tract area consisted of subaerially exposed coastal plain (Miller 1983; Saucier 1963). Therefore, both Paleo-Indian and Early Archaic cultures may have occupied the coastal plain in the Meraux Tract project area. Archeological deposits associated with these prehistoric cultures would have accumulated on the surface of this coastal plain; the surface currently is buried and probably represents the partially truncated paleosol designated as the First Weathering Horizon. During the Holocene transgression, shoreface and marine processes eroded this surface and its associated archeological deposits to varying degrees. The degree of truncation exhibited by an exposed section of the First Weathering Horizon as described by Miller (1983:90-92) indicates that the transgressive erosion failed to remove this paleosol from the surface of this buried coastal

plain. Undoubtedly, the shallow depth of this erosion failed to impact this paleosol, which lies in the sediments filling the valleys cut into the former coastal plain.

Between 6000 - 3500 radiocarbon B.P., the project area was open water, i.e., part of the Gulf of Mexico (Otvos 1978). During this period, the Meraux Tract area was unavailable for occupation. Therefore, Middle and Late Archaic archeological deposits should be absent from the Meraux project area.

Aggradational sediments associated with the St. Bernard Delta Complex and later natural levee deposits of the present Mississippi River course have accumulated in the general project area since 3400 radiocarbon years B.P.; archeological deposits of Poverty Point and later cultures are probable (Figure 2). The archeological deposits would be concentrated primarily in the natural levee of the Metairie Ridge that lies to the north outside the Meraux Tract project area.

Fauna and Flora

The flora and fauna of the project region vary greatly between the natural levees and adjacent freshwater swamps. The fauna and flora variances result from the distinct differences in the drainage of each area (Penfound and Hathaway 1938).

Natural Levee Terrane

Minimal information is available concerning the native vegetation community that existed on the natural levees of the New Orleans area prior to its occupation by European settlers. Presumably, it resembled the vegetative communities still found on natural levees of distributaries elsewhere in the Mississippi Delta Plain. If so, these natural levees were covered by an oak forest floral assemblage. The principle overstory in the oak forest would have included water oak (*Quercus nigra*), overcup oak (*Quercus lyrata*), cottonwood (*Populus deltoides*), sweetgum (*Liquidambar styraciflua*), sycamore (*Platanus occidentalis*), redgum, black willow (*Salix nigra*), hackberry (*Celtis laevigata*), swamp privet (*Forestiera acuminata*), water locust (*Gleditsia aquatica*), and honey locust (*Gleditsia triacanthos*). The understory would have included shrubs such as buttonbush (*Cephalanthus occidentalis*), wax myrtle (*Myrica cerifera*), dwarf palmetto (*Sabal minor*), marsh elder, elderberry (*Sambucus canadensis*), and yaupon (*Ilex vomitoria*), as well as vines such as trumpet creeper (*Campis radicans*), poison ivy (*Rhus radicans*), and rattan vine (*Berchmis scandens*). The groundcover of the natural levee would have consisted of various grasses (*Gramineae*) and sedges (*Cyperaceae*) (Craig et al. 1987; Penfound and Hathaway 1938).

Similarly, little is known about the fauna present in the prehistoric oak forests that grew on the natural levees of the Mississippi River and Bayou des Familles. However, these forests undoubtedly supported a variety of mammals, birds, and reptiles. The fauna typically found in the natural levee terrain included mammals such as white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), fox squirrel (*Sciurus niger*), eastern cottontail (*Sylvilagus floridanus*), swamp rabbit (*Sylvilagus aquaticus*), and black bear (*Ursus americanus*). The fauna associated with these oak forests also includes predator mammals such as red fox (*Vulpes fulva*), gray fox (*Urcyon cinereoargenteus*), raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), mink (*Mustela vison*), and bobcat (*Felis rufus*). These species, together with raptors, are important in limiting the size of rabbit, mouse, squirrel, and bird populations. The mink, opossum (*Didelphis virginiana*), and raccoon are important as fur bearers, as are nutria (*Mycocaster coypus*), a recently introduced species. Some of the birds found in these forests are painted bunting (*Passerina cirris*), red-winged blackbird (*Agelaius phoenicews*), common crow (*Corvus brachyrhynchos*), common nighthawk (*Chordeiles minor*), screech owl (*Otus asio*), black vulture (*Coragyps atratus*), turkey vulture (*Cathartes aura*), and many others. The oak forests are home to amphibians and include

salamanders, toads, tree frogs, and true frogs. Reptiles found in the oak forests include a number of iguanids, skinks, lizards, snakes, pit vipers, and turtles (Lowery 1974a, 1974b; Penfound and Hathaway 1938).

Initially, large farms and plantations replaced the oak forests of the natural levees. As a result, the natural levees became covered with large tracts of sugarcane, cotton, rice, tobacco, indigo, and citrus trees. Later growth in the New Orleans area for business and residential purposes has erased crop land and forests from the project area.

Inland Swamp Terrane

As with any interdistributary area in the Mississippi Delta, inland swamp covers the area between the natural levees of the Mississippi River and the relict distributary ridge of the Bayou Sauvage Delta. West of the project area, the inland swamp grades into fresh and intermediate (brackish) marsh and eventually into saltwater marsh (Kolb 1962; Kolb and Saucier 1982).

Prior to historic drainage and other disturbance, the inland swamp consisted entirely of freshwater wetland covered by water-tolerant trees and aquatic understory plants. Shallow water covered this area throughout most or all of the growing season. The overstory of an undrained, inland swamp consists of varying proportions of bald cypress (*Taxiodium distichum*), tupelo gum (*Nyssa aquatica*), and one or more species of other gums (*Nyssa* sp.). Trees such as swamp blackgum (*Nyssa sylvatica var. biflora*), swamp red maple (*Acer rubrum var. drummondi*), black willow (*Salix nigra*), pumpkin ash (*Fraxinus profunda*), green ash (*Fraxinus pennsylvanica*), water elm (*Planera aquatica*), water locust (*Gleditisia aquatica*), and Virginia willow (*Itea virginia*) also are common to the freshwater swamp. In addition, shrubs such as palmetto, buckrush (*Baccharis halimifolia*), buttonbush (*Cephalanthus occidentalis*) and numerous grasses are present. The most common grasses include alligatorweed (*Alternanthera philoxeroides*), common rush (*Juncus* sp.), maidencane (*Panicum hemitomom*), pickerelweed (*Potamogeton nodosus*), bulltongue (*Sagittaria latifolia*), and cattail (*Typha* sp.) (Craig et al. 1987; Penfound and Hathaway 1938).

The rich flora of an undrained freshwater swamp supports a diverse faunal population, including a variety of large reptiles and amphibians and large numbers of crawfish, bullfrogs, leopard frogs, water snakes, ducks, squirrels, alligators, wading birds, raccoons, mink, and otter. When the freshwater swamp is dry, it is used by swamp rabbits, nutria, turkeys, and white-tailed deer. Small ponds and perennial streams in the freshwater swamp contain abundant freshwater fish (Penfound and Hathaway 1938; Trahan 1989).

Climate

The project area has a humid subtropical climate with prevailing southerly winds. The long summers are hot and humid, and the winters are warm but occasionally are interrupted by incursions of cool air from the north (Trahan 1989). The average annual normal rainfall in Orleans Parish, just west of the project area, is 150 cm (59 in). July, August, and September are the wettest months, with a normal average precipitation that varies from 15.7 to 16 cm (6.19 to 6.32 in). October is the driest month, with a normal average precipitation of 7.21 cm (2.84 in). The heaviest one-day rainfall at New Orleans for the period of record was 24.9 cm (9.8 in); it occurred May 31, 1959. Rainfall and hurricane storm surge are the main causes of flooding in the project area. The rainfall associated flooding results from either near-stationary cold fronts or hurricanes. Both situations are capable of producing rainfall at a rate of one or more inches per hour (Trahan 1989).

The movement of maritime tropical air masses from the Gulf of Mexico keeps temperatures in the project area from varying greatly. The average normal maximum annual temperature of this area is 25.2° C (77.4° F). During winter, the average normal maximum annual temperature is 12.2° C (54° F). The coldest month is January, with an average maximum temperature of 16.4° C (61.5° F). During summer, the average normal maximum annual temperature is 32.2° C (90° F). The hottest month is July, with an average maximum temperature of 32.4° C (90.4° F). The lowest recorded temperature, which occurred at New Orleans on February 13, 1898, is -14° C (6.8° F). The highest recorded temperature, which occurred at New Orleans on June 27, 1967, is 36.6° C (98° F) (Trahan 1989).

CHAPTER III

PREHISTORIC SETTING OF THE PROJECT AREA

The Meraux Tract project area lies on the east bank of the Mississippi River near the upriver end of St. Bernard Parish, Louisiana. The archeological record of Louisiana extends as far back as the Paleo-Indian stage (ca. 10,000 B.C.). However, surface landforms in the vicinity of the Meraux Tract, i.e., Meander Belt No. 1 on the Mississippi River alluvial plain, date only from the Neo-Indian stage (ca. 1500 B.C.). As noted in Chapter II, it is conceivable that cultural resources dating from the Paleo-Indian and Early Archaic stages could occur in the vicinity of the project area near the top of the Prairie Complex, approximately 18 to 22 m (59.1 to 72.2 ft) below modern sea level. Rises in sea level after the last glaciation inundated the area during the Middle and Late Archaic stages. No resources dating from these stages are anticipated; however, information concerning these stages is provided in this chapter for continuity. Buried Poverty Point and Tchefuncte sites may occur in the project area, but it is expected that the oldest surface sites will have a Marksville cultural affiliation.

Several studies are critical to understanding the development of southern Louisiana prehistory. Neuman (1984) synthesized Louisiana prehistory and summarized the findings of many of the most significant archeological excavations conducted in the state. His work represents one of the most complete compilations of Louisiana prehistory to date. Some other state and regional studies also provide important overviews for understanding Native American settlement in Louisiana. Although Walthall (1980) emphasizes prehistoric development in Alabama, he also provides useful data on prehistoric occupation throughout the southeastern United States. Likewise, Jenkins and Krause (1986) discuss Mississippi and Alabama prehistory but also present data applicable to Louisiana prehistory. Kniffen et al. (1987) discuss historic Native American tribes in Louisiana from initial contact with early European explorers until the present.

Goodwin et al. (1991) provide the most complete discussion to date on geoarcheology in coastal Louisiana. This discussion includes an analysis of the relationships among land formation, archeological site distribution, site preservation, and destruction processes. Following an overview of coastal Louisiana prehistory, the volume describes the interrelated geomorphic processes that affect land formation and deterioration. Applicable delta complexes and their probable dates of formation are discussed, and recognized coastal zone geomorphic regions also are characterized. Finally, Goodwin et al. (1991) discuss the geoarcheology of the region, i.e., the relationship of geomorphic processes, prehistoric settlement, and site preservation. Summary tables list anticipated geomorphic locations of surface and buried archeological deposits in identified physiographic regions; they also provide an assessment of expectations for buried and surface sites of different cultural components in described geomorphic regions.

Smith et al. (1983) divide the state into six management units. St. Bernard Parish is one of 14 parishes contained in Management Unit V. This management unit is dominated by the Mississippi River alluvial valley, and it extends southeast from Pointe Coupee Parish to the mouth of the Mississippi River in Plaquemines Parish. Smith et al. (1983:95) identify 25 cultural themes relevant to Management Unit V. Listed Native American cultural themes that are potentially germane to the project area include: (1) Tchefuncte Culture; (2) Marksville Culture; (3) Troyville-Coles Creek Culture; (4) Plaquemine Culture; (5) Mississippian Cultural Influence; (6) Prehistoric Agriculture - Its Form, Extent and Importance; (7) Prehistoric Adaptation to the Alluvial Valley; (8) Prehistoric Adaptation to the Changing Deltas; (9) Prehistoric Coastal Subsistence and Settlement Patterns; (10) European-Native American Contact; (11) Historic Native American Acculturation; and (12) Culture History. Identified themes that concern the historic, predominantly non-Native American development of the region include: (1) The Influence of the Mississippi River on Historic Settlement; (2) Historic Exploration and Colonization of Louisiana; (3)

Plantation Archeology; (4) Historic New Orleans; (5) Ethnic Enclaves: The Blacks, Acadians, Germans and Other Immigrants; (6) Euro-American Influence on the Landscape; and (7) Culture History.

Following discussion of the six management units, Smith et al. (1983:127) summarize the 14 identified cultural units that comprise the cultural development of Louisiana. The following cultural units could be associated with the project area: (1) Poverty Point; (2) Tchefuncte; (3) Marksville; (4) Troyville-Coles Creek; (5) Plaquemine; (6) Mississippian; (7) Historic Contact; (8) Exploration and Colonization; (9) Antebellum; (10) War and Aftermath; and (11) Industrialization and Modernization. Relevant research themes are presented for each cultural unit, followed by a summary of known sites, and specific research and preservation goals.

Evaluation of potentially significant archeological sites in Louisiana should be accomplished in the context of the research issues outlined in the state archeological plan (Smith et al. 1983), as well as within the known prehistoric or historic cultural chronologies developed for the region. An overview of the cultural development of the southeastern Louisiana area, from Paleo-Indian through historic contact, provides the context for evaluating prehistoric deposits that may exist in the current project area. The historic development of the general project area is discussed in Chapter V. To date, no prehistoric archeological sites have been recorded along the Mississippi River natural levee within 1.6 km (1 mi) of the Meraux Tract project area.

Paleo-Indian Stage (10,000 - 6000 B.C.)

The earliest inhabitants of Louisiana were Paleo-Indians who arrived in the region as early as 12,000 B.C. However, the archeological record only documents their presence in Louisiana from 10,000 - 6000 B.C. (Smith et al. 1983; Webb et al. 1971). Little is known about the lifeways or culture of the Paleo-Indians, but it generally is agreed that they formed highly mobile, band-level groups who followed the migrations of large herds of now-extinct giant mammals such as mammoth, mastodon, and bison. Reliance on big game hunting is reflected in the various bifacially worked projectile point types, fluted lanceolate projectile points, bifacial cleavers, core handaxes, knives, drills, disks, and end and side scrapers. Although the Paleo-Indian lithic technology was not expansive, it exhibited high-quality workmanship. Tools show evidence of fine flaking, retouching, basal grinding, and thinning (Smith et al. 1983).

Distributional studies show that Paleo-Indian sites in the eastern United States tend to occupy the eroded surfaces of terraces and plateaus. More fluted points have been recovered from the highlands of Tennessee and Kentucky than anywhere else in North America (Walthall 1980:26). In Louisiana, Paleo-Indian sites have been found in the Tertiary uplands and the uplands/floodplain bluffs. These sites are characterized by surface finds of Clovis, Folsom, Scottsbluff, Plainview, and other early projectile point types. The northwestern parishes of Louisiana have produced more projectile points than other areas of the state. No projectile points have been located in the major river drainages to the south and east because near-surface deposits in these areas are geologically too young to include Paleo-Indian strata. No Paleo-Indian sites have been found in the New Orleans vicinity, south of Lake Pontchartrain.

During the late Paleo-Indian stage, the climate gradually warmed, and continental glaciation decreased. Herds of mammoth, mastodon, and bison declined, and southeastern Paleo-Indians adapted their hunting strategies to the developing oak-hickory forest environment and to its modern fauna (Walthall 1980). This adaptation is reflected by changes in tool assemblage and population density. Earlier Paleo-Indian tool assemblages included mostly projectile points made from exotic, non-local materials. Late Paleo-Indian tool assemblages included knives, scrapers, chisels, gravers, drills, and adzes, most of which were made from locally available materials. Overall point size also decreased, indicating an increased reliance on smaller game such as deer. Finally, many more late Paleo-Indian sites have been identified than earlier sites, possibly reflecting a population increase (Neuman 1984). The transition from the Paleo-

Indian to the Archaic stage was gradual and likely occurred sooner in some areas than others, but the transition was complete by about 6000 B.C.

Archaic Stage (6000 - 1000 B.C.)

The Archaic stage is characterized by a more diversified hunting and gathering subsistence system than that evidenced during the Paleo-Indian stage, ultimately resulting in the development of quasi-permanent settlements (Neitzel and Perry 1978). The hunting and gathering tradition involved seasonal movement and exploitation of a home range defined by the availability of nuts, fruits, fish, game, and other natural resources (Muller 1983). Populations continued to expand, as evidenced by the increased number of sites dating from the Archaic stage. Large tribal gatherings were common during spring and summer, but during winter they split into small bands to exploit nearby upland ranges (Jenkins 1974; Muller 1983). A greater variety of faunal and floral species were exploited during the Archaic stage than during the Paleo-Indian stage, including raccoon, opossum, dog, groundhog, squirrel, fox, beaver, bear, wildcat, rabbit, skunk, chipmunk, mink, muskrat, otter, porcupine, wild turkey, turkey vulture, passenger pigeon, goose, sandhill crane, turtle, snake, and deer. The great Pleistocene mammals, or megafauna, were extinct by this time (Neuman 1984). The Archaic artifactual assemblage included side-stem points and corner-notched points, adzes, and choppers. New techniques for polishing and grinding granitic rock, sandstone, slate, steatite, and scoria appeared, and shell and bone also were used throughout the latter half of the period. Burial sites dating from the Archaic stage have been found at several locations in Louisiana (Neuman 1984; Walthall 1980).

The Archaic generally is broken into three subdivisions: Early Archaic, Middle Archaic, and Late Archaic. The Early Archaic represents a change in subsistence patterns. Paleo-Indians primarily exploited Pleistocene megafauna, but the Early Archaic Native Americans utilized a wider variety of resources. Spurred by the extinction of Pleistocene megafauna, the economy was expanded to include extensive gathering as a supplement to the hunting of smaller game. Projectile point styles dating from the late Paleo-Indian and Early Archaic stages are common throughout portions of Louisiana. These styles include Angostura, Dalton, Eden, Meserve, Quad, San Patrice, and Scottsbluff projectile points (Neitzel and Perry 1978; Neuman 1984; Smith et al. 1983).

In the southeastern United States, the Early Archaic stage is divided into four chronological horizons: Dalton, Big Sandy, Kirk, and Bifurcate (Walthall 1980). The earliest of these, the Dalton horizon, generally is restricted to the eastern United States south of the Ohio River valley. The Dalton horizon tool assemblage includes small to medium-sized, lanceolate to pentagonal-shaped projectile points with serrated edges, and grinding often is present around the hafting portions of these points. Social structure appears to have been at the band level. Resource procurement was directed to the exploitation of riverine faunal and floral species (Muller 1983; Walthall 1980). The Big Sandy horizon is recognized by side-notched projectile points with steep triangular blades and serrated edges. Like Dalton horizon projectile points, Big Sandy points were ground along the hafting region. Big Sandy projectile points are spread over an area wider than that of the Dalton horizon, extending from Arkansas to Florida and north to the Great Lakes region (Walthall 1980). The Kirk horizon is characterized by medium-sized, corner-notched projectile points, with deep serrations along the blades. This horizon extends throughout the forested regions of the eastern United States, suggesting an adaptation to a forested environment (Walthall 1980). The Bifurcate horizon is identified by small, bifurcated-stem projectile points, and the blade edges usually are serrated. The distribution of the bifurcate tool assemblage is similar to that of the preceding Kirk horizon (Walthall 1980).

The Middle Archaic is characterized by the interaction of three interrelated events. First, the effects of continental glaciation decreased throughout the Early Archaic, resulting in a warmer and drier climate. By 4000 - 3000 B.C., modern climatic and environmental conditions were established. Second, in some areas the sociopolitical organization changed, with an increased emphasis on ranked societies. This

change resulted in increased territorialism and corresponding regional diversification. Finally, technological developments occurred during the Middle Archaic, especially with ground stone, bone, and antler implements. The Morrow Mountain horizon typifies the Middle Archaic. It is represented by small to medium-sized, triangular projectile points with short tapered stems. Morrow Mountain forms are distributed widely, having been recovered from the eastern seaboard to as far west as Nevada, and from near the Gulf of Mexico to as far north as New England (Walthall 1980).

The Late Archaic reflects a period of population growth, evidenced by the increasing number of sites found throughout the United States. Stone vessels made from steatite and fiber-tempered pottery are hallmarks of the Late Archaic. Archaic projectile point types found throughout much of Louisiana include Carrollton, Delhi, Elam, Ensor, Evans, Frio, Gary, Hall, Kent, Kirk, Macon, Marcos, Marshall, Morhiss, Morrow Mountain, Pontchartrain, Tortugas, Trinity, Wells, and Williams. In the eastern United States, the Late Archaic economy focused on a few essential resources, including deer, mussels, and nut foods. Jenkins (1974) identified a seasonal procurement strategy common throughout the middle Tennessee River valley during the Late Archaic. Macrobands formed after the spring rains in late April or May, exploiting forested riverine areas. Archeological investigations at Late Archaic shell middens and mounds indicate a reliance on shellfish, fish, and riverine fauna and flora for subsistence. During the winter months, beginning in October or November, Late Archaic peoples split into microbands and subsisted on harvested and stored nut foods and faunal species common to the upland areas. Typical Archaic site locales include boundary Quaternary and Tertiary areas with relatively flat or undulating bluff tops overlooking floodplains.

Although the recovery of Archaic projectile points is common throughout much of the state, Neuman (1984) and Neitzel and Perry (1978) have concluded that Louisiana sites have contributed relatively little to understanding Archaic cultures in the southeastern United States. In Louisiana, few discrete, intact archeological deposits dating from the Archaic period have been excavated systematically, analyzed, and comprehensively reported (Neuman 1984).

Neo-Indian Stage (1500 B.C. - A.D. 1700)

The Neo-Indian stage is composed of Poverty Point, Tchefuncte, Marksville, Troyville-Coles Creek, Caddo, Plaquemine, and Mississippian cultures. These cultural units generally date between 1500 B.C. and historic contact. Because there is no archeological evidence that Caddo culture extended into southeastern Louisiana, that cultural unit is not addressed in this discussion.

The Neo-Indian stage is distinguished from the preceding Archaic stage by the introduction and eventual widespread use of pottery. Pottery initially was used during the Poverty Point period, but its use became widespread by the subsequent Tchefuncte period. As such, Poverty Point normally is considered transitional, possessing characteristics of both the Archaic and the Neo-Indian stages. Other cultural developments differentiate Neo-Indian from earlier Archaic sites. Neo-Indian sites often are larger than Archaic sites, suggesting both increased population densities and some degree of sedentism. In addition, several important technological and cultural developments occurred during the Neo-Indian stage. These developments included the introduction of the bow and arrow, extensive use of agriculture, large-scale mound construction, and the widespread emergence of ranked societies. Technologies were introduced and diffused throughout the southeast, creating regionally distinct artifactual inventories.

Poverty Point Culture (1500 - 500 B.C.)

Poverty Point culture is named for the Poverty Point type site (16WC5) located in the northeast corner of the state in West Carroll Parish, Louisiana. The site consists of six artificial earthen ridges that

measure 15 to 46 m (50 to 150 ft) in width and terminate near Bayou Maçon. The outer ridge has a diameter of approximately 1.2 km (0.75 mi). These ridges are segmental, creating four aisles that radiate from an interior plaza. In addition to the ridges, a number of mounds were constructed throughout the immediate site area. The largest of these, Mound A, may have been constructed to represent a bird with spread wings (Neuman 1984; Webb 1977). At the time of its construction, Poverty Point represented the largest earthworks system in the Americas.

Poverty Point sites are distributed linearly throughout the Mississippi River valley and along three of its major tributaries: the Arkansas, Ouachita, and Yazoo rivers. Typical Poverty Point locations include Quaternary terraces or older landmasses overlooking major stream courses, major natural levees of active or relict river channels, river/lake junctions, and coastal estuaries or older land surfaces in the coastal marsh. The common factor in these locations is the presence of contact zones, at the interface of two or more ecotones. These strategic locations enabled exploitation of a combination of diverse faunal and floral resources (Gagliano and Saucier 1963; Webb 1977).

The position of the Poverty Point type site (16WC5) on Maçon Ridge, overlooking Bayou Maçon in northeastern Louisiana, has led to speculation that this location allowed the inhabitants to exploit, if not control, the flow of trade goods between other communities (Muller 1983; Neitzel and Perry 1978; Smith et al. 1983). The artifact assemblage at Poverty Point includes tools and resources made from raw materials originating in Alabama, Arkansas, Illinois, Indiana, Ohio, and Tennessee. Other indicators of long-distance trade include steatite vessels from Georgia and North Carolina, copper from Michigan, and pottery from the St. Johns River region of Florida. The presence of non-utilitarian items such as lapidary work, panpipes, and animal effigies in stone and shell suggests a hierarchical social organization at the Poverty Point type site (16WC5). The lapidary work included exotic ornamental beads and pendants, in both geometric and animal shapes (Neuman 1984).

Several traits characterize Poverty Point culture. Large regional ceremonial centers with earthworks were constructed near major waterways. These regional centers served as focal points for religious, political, and trade-related activities. These large centers were surrounded by small dispersed villages and hamlets, where most of the population lived. Food resources apparently were collected at the villages and hamlets and redistributed at the ceremonial centers. The construction of the large earthworks implies the presence of an elite ruling class capable of organizing and directing a labor force proficient in the construction of the earthworks.

Large numbers of clay balls recovered from Poverty Point sites have been interpreted as cooking balls, which were heated and then used to roast and bake food. These clay balls, known as Poverty Point Objects, were formed into a wide variety of decorated and undecorated shapes. Whether this variety served a functional purpose remains unclear. The cooking balls were used as a substitute for stone, which is scarce in the lower Mississippi River alluvial valley (Ford and Webb 1956; Neuman 1984; Webb 1968).

Poverty Point culture exhibits a well-developed chipped and ground stone lithic technology. This technology reflects both the paucity of lithic deposits in the lower Mississippi River alluvial valley and the availability of exotic lithic material through the extensive trade network. In addition to lapidary work, Poverty Point peoples made a variety of elaborate tools that melded function and aesthetics. Ground stone tools included hematite and magnetite plummets, atlatl weights, and gorgets. Chipped stone tools included well-made points and microtools, i.e., small stone tools normally under 2.5 cm (1 in) in length (Neuman 1984; Smith et al. 1983).

Radiocarbon dates ranging from 2040 - 865 B.C. suggest that diagnostic Poverty Point developments began along the Gulf Coast and spread inland through the Mississippi River basin, where they reached their zenith (Neuman 1984). Both local adaptation and Meso-American influence probably provided the impetus during the earliest developmental stages of this complex society.

In southeastern Louisiana, Bayou Jasmine phase and Garcia phase sites exhibit traits characteristic of the earlier Archaic stage, but with the addition of Poverty Point-like traits. These Poverty Point sites suggest seasonal and specialized adaptation to the marsh environments. Bayou Jasmine phase sites typically are located on the western shore of Lake Pontchartrain and on natural levee ridges of Mississippi River distributaries. The phase, named after the Bayou Jasmine site (16SJB2) in St. John the Baptist Parish, Louisiana, is typified by *Rangia* shell and earth middens, by an artifact assemblage that includes Poverty Point baked clay objects, by a distinct lithic subassemblage that does not exhibit the classic Poverty Point microlithic assemblage, and by bone artifacts. Pontchartrain points occasionally are recovered from these sites. Faunal remains recovered from Bayou Jasmine sites include those of small animals such as muskrats, birds, and fish, as well as some larger mammals like deer and bear. Radiocarbon tests date the Linsley site (16OR40), a Bayou Jasmine phase shell midden cluster, from around 1740 B.C., very early in the Poverty Point sequence (Gagliano 1963). Site 16OR40 is described briefly in Chapter IV of this report.

Garcia phase sites are located along the eastern shore of Lake Pontchartrain. The Garcia site (16OR34), the type site for the Garcia phase, contained a beach deposit of *Rangia* shells and midden debris. The Garcia phase artifact assemblage differs substantially from the Bayou Jasmine assemblage in that it lacks Poverty Point baked clay objects but includes a typical Poverty Point lithic complex. Garcia phase sites on the eastern shore of Lake Pontchartrain date from about 1,000 years later than the Bayou Jasmine phase. A thermoluminescence date of 650 B.C. ±240 years from the Claiborne site (22HC35) in Mississippi may date the Garcia phase more accurately (Jeter and Williams 1989).

Tchula Period/Tchefuncte Culture (500 B.C. - A.D. 300)

By about 800 B.C., the culture that had fostered the massive earthen constructions at Poverty Point and lesser, though still prominent, earthworks at regional centers had declined. Steatite vessels and fiber-tempered pottery also disappeared and were replaced by the use of sand-tempered and clay-tempered wares characteristic of Tchefuncte culture. There is considerable evidence of continuity, however, between Tchefuncte and Poverty Point times in subsistence, settlement, and other basic patterns. Much of the Poverty Point chipped-stone technology survived, as did the custom of making baked-clay cooking balls, though fewer were made and their variety was limited.

Tchefuncte culture was defined at the Tchefuncte site (16ST1), on the north shore of Lake Pontchartrain in St. Tammany Parish. The site, composed of two proximate shell middens, was excavated between 1939 and 1941. The dominant Midden A measured approximately 30 x 76 m (100 x 250 ft), and Midden B measured approximately 30 x 45 m (100 x 150 ft). Materials recovered during excavation included nearly 50,000 ceramic sherds and considerable numbers of lithic artifacts, pottery objects, bone, and shell. A total of 43 human burials were excavated, consisting of 21 primary flexed interments and 22 apparent secondary bundle burials; none of the burials was associated with any grave goods. This dearth of funerary associations is a pattern characteristic of Tchefuncte sites (Ford and Quimby 1945; Neuman 1984; Weinstein and Rivet 1978).

Dominant Tchefuncte sites excavated south of Lake Pontchartrain include Little Woods Middens (16OR1 - 16OR5) and Big Oak Island (16OR6). The Little Woods Middens consisted of a series of five shell middens a short distance south of Lake Pontchartrain. The middens were reported while they were being mined for shell, when numerous artifacts and human burials were observed. During salvage excavations, two cultural horizons were identified. The basal Tchefuncte shell midden horizon varied from 0.3 to 2.1 m (2 to 7 ft) in thickness and was capped by an approximately 45 cm (1.5 ft) thick Coles Creek midden. In addition to numerous artifacts, eight Tchefuncte burials were excavated; six of these burials were primary flexed burials, and one was associated with two quartz crystals. The remaining two burials included an extended burial and an isolated skull. Unfortunately, project field notes and much of the recovered material were misplaced, and remaining artifacts were combined into one collection (Neuman

1984). In 1939, limited testing was conducted at Big Oak Island (16OR6), in a marsh northeast of New Orleans. The site consisted of a 220 x 23 m (725 x 75 ft) crescent-shaped shell midden that rose 2.7 m (9 ft) above the surrounding marsh. In addition to considerable amounts of artifactual material, primary flexed burials apparently were recovered from the site. A thorough discussion of the excavations, including the burials, has not been prepared.

The Tchula period is characterized by the first widespread use of pottery, but in the context of a Late Archaic-like hunting and gathering tradition and tool inventory (Neuman 1984; Smith et al. 1983). The introduction of pottery undoubtedly brought innovations in food preparation and changes in eating habits (Neuman 1984). Ceramic objects are important because they represent a means of cultural expression manifested in tempering, vessel form, decorative techniques, and color. Pottery distribution also suggests significant interaction with groups throughout the lower Mississippi River valley and to the east.

Tchefuncte ceramics may have been influenced by the Stallings Island complex of the Georgia-Florida coast (Speaker et al. 1986). Tchefuncte or Tchefuncte-like ceramics have been reported from southeastern Missouri, northwestern Mississippi, the Yazoo Basin, coastal Alabama, and northeastern and southeastern Texas (Neuman 1984; Smith et al. 1983).

Tchefuncte ceramic wares have a soft, chalky paste tempered with either sand or clay and generally are not well made (Phillips 1970). Vessel forms include bowls, cylindrical and shouldered jars, and globular pots. Some Tchefuncte vessels are footed or include other types of vessel supports. Although many vessels are plain, some are decorated with punctations, incisions, simple stamping, drag and jab, and rocker stamping. The frequency of punctated types (e.g., Tammany Punctated, Lake Borgne Incised, and Orleans Punctate) suggests that punctations were preferred over paddle-stamped decorations. Motifs included parallel and zoned banding, stippled triangles, chevrons, and nested diamonds. Red ocher also was applied to some vessel exteriors (Phillips 1970; Smith et al. 1983:164; Speaker et al. 1986:38). Plainware ceramics contemporary with those of the Tchefuncte culture have been reported in southwestern Arkansas (Schambach 1982) and northeastern Texas.

Tchefuncte artifact assemblages illustrate cultural continuity with Poverty Point culture. Stone and bone artifacts found in Tchefuncte deposits are indistinguishable from those recovered in Late Archaic or Poverty Point sites. Tubular pipes and baked clay balls reminiscent of Poverty Point deposits also are found. Therefore, Tchefuncte sites are identified mainly by the presence of Tchefuncte pottery types.

Chipped stone artifacts are limited to projectile points and to classes of elongated leaf-shaped, ovate, and sub-rectangular tools known as drills, scrapers, and knives. Many Tchefuncte points are classified as Gary, which are typified by long, ovate-triangular blades, diamond-shaped in cross section, with poorly defined shoulders and round to square stems. Other characteristic projectile points include Delhi, Ellis, Epps, Maçon, Motley, and Pontchartrain (Ford and Quimby 1945; Smith et al. 1983:163).

Ground stone implements include boatstones, bar gorgets, and grooved plummets. Sandstone was used for saws, abraders, and milling stones. Bone and antler tools are very conspicuous at Tchefuncte sites. The most common forms include socketed projectile points, fishhooks, harpoons, atlatl hooks, flakers, chisels, awls, handles, and ornaments. Although the variety of tool types declined somewhat, the overall stone and bone tool subassemblages remained nearly unchanged from the preceding Poverty Point culture. Chisels, containers, punches, and ornamental artifacts also were manufactured from shell.

The expansive interregional trade network of the preceding Poverty Point culture had declined, but intraregional relationships had intensified with population growth during the Tchula period. Tchefuncte social organization generally is interpreted as egalitarian; neither burials nor individual artifacts indicate a society developed around status-based distinctions. Tchefuncte social organization was at the band level, with as many as 50 individuals per band. The uniform distribution of pottery types may indicate a patrilocal

residence with exogamous band marriage, resulting in the widespread distribution of similar pottery types and motifs (Speaker et al. 1986:39).

Tchefuncte sites tend to be small and simple. Substantive evidence for participation in long-distance trade networks is unavailable; tools, ornaments, and other essentials were made of locally available materials such as antler, bone, chert, sandstone, and shell. In southeastern Louisiana, Tchefuncte sites generally consist of shell middens on the higher portions of the natural levees, cheniers, and lakeshores. Several Tchefuncte sites are recorded along the Bayou Sauvage natural levee, including 16OR39, 16OR41 (described in Chapter IV), 16OR70, and possibly 16OR71. There is an almost total absence of identified Tchefuncte sites along the Mississippi River and its major active tributaries and distributaries (e.g., Deer Creek and the Sunflower, Tallahatchie, Atchafalaya, and Red rivers), reflecting the relative recency of the surrounding land surfaces.

Subsistence based on hunting, fishing, gathering and possible incipient horticulture is evidenced by stone points, antler points, splintered-bone points, bone harpoon heads, antler atlatl hooks, stone atlatl weights, bola stones, and bone fishhooks. The majority of the bone recovered from Tchefuncte sites is deer bone. Commonly recovered remains include raccoon, muskrat, alligator, and fish, especially catfish, black drum, bowfin, and alligator gar. The preponderance of freshwater fish remains at sites such as Big Oak Island (16OR6) and Little Oak Island (16OR7) indicate a reliance on aquatic resources (Shenkel and Gibson 1974). It is interesting to note that no crustacean remains were recovered from these Tchefuncte midden deposits even though crustaceans were plentiful in the region and easy to gather. This absence may reflect poor preservation but more likely reflects limited use of the resource.

Well-preserved floral and faunal remains from Morton Shell Mound (16IB3) in Iberia Parish suggest that some coastal sites were seasonal occupations, with primary occupations during the summer and autumn and possibly during the spring (Byrd 1976). This pattern of seasonality has not been confirmed. Floral remains included hickory nuts, acorns, plums, grapes, and persimmons. Squash seeds and rinds may evidence horticultural activity, though bottle gourd does occur in the wild.

Tchefuncte sites are classified most commonly as coastal middens or inland villages and hamlets. Settlements reflecting coastal adaptations tend to be located near slack-water environments of slow, secondary streams that drain the bottomlands, near floodplain lakes, and in littoral settings (Neuman 1984). Coastal site locations apparently were best suited for exploiting a variety of fresh and brackish water resources, particularly clam (*Rangia cuneata*) (Shenkel 1984). Inhabitants of inland sites oriented to the exploitation of terrace and floodplain habitats were less reliant on brackish water resources (Shenkel 1984).

Most coastal Louisiana Tchefuncte sites are clustered in the Pontchartrain Basin in the southeast and around Grand Lake in the southwest. In the Pontchartrain Basin, the sites generally are situated on natural levees and relict beach ridges such as the New Orleans Barrier Island Trend south of Lake Pontchartrain. The chenier ridges in southwestern Louisiana also were settled during this period. No Tchefuncte sites are known in St. Bernard, Plaquemines, and Terrebonne parishes, reflecting the recency of these landforms (Jeter and Williams 1989).

Two Tchefuncte phases are identified in southeastern Louisiana. The Pontchartrain phase encompasses the margins of Lake Pontchartrain and Lake Maurepas. It is characterized by a variety of poorly made sandy wares, including Tammany Punctated *var. Cane Bayou*, Tchefuncte Plain *var. Mandeville*, Tchefuncte Stamped *var. Lewisburg*, Tchefuncte Incised *var. Abita Springs*, Lake Borgne Incised *var. Ponchitolawa*, and Mandeville Stamped *var. Mandeville*. Other artifacts include Pontchartrain and Kent projectile points, clay tubular pipes, bone points, and Poverty Point-like clay cooking balls (Jeter and Williams 1989). Several Pontchartrain phase sites have been investigated, including Little Woods Middens (16OR1 - 16OR5); Tchefuncte (16ST1) (Ford and Quimby 1945); Big Oak Island (16OR6) (Ford and Quimby 1945; Shenkel 1980, 1981, 1984; Shenkel and Gibson 1974); Little Oak Island (16ST7) (Ford

and Quimby 1945; Shenkel 1980, 1981, 1984); and a component of the Bayou Jasmine site (16SJB2) (Duhe 1976).

The Beau Mire phase was identified by Weinstein and Rivet (1978) at the Beau Mire site (16AN17), located west of Gonzales, Louisiana, along New River. This phase is characterized by earth midden sites along relict Mississippi River meanders or distributaries, including crevasse distributaries. The Beau Mire site is a late Tchefuncte phase site, probably post-dating the Pontchartrain phase.

Marksville Culture (A.D. 100 - 400)

Named for the type site at Marksville (16AV1) in Avoyelles Parish, Louisiana, Marksville culture often is viewed as a localized version of the elaborate midwestern Hopewell culture. The arrival of Hopewellian influence in the lower Mississippi River valley is marked by the widespread and apparently sudden presence of conical mounds, ceramics, and Hopewellian status-related artifacts. The similarities between Marksville and Hopewell cultures in pottery manufacture and decoration, mound construction, and burial patterns are so strong that some conclude that Hopewellians actually relocated to the Marksville culture area (Muller 1983).

Marksville culture is marked by an intensification of ritual associated with mortuary activities and by a resurgence in interregional exchange of prestige items (Cantley et al. 1984). The Marksville economic base retained the hunting, fishing, and gathering subsistence strategy of earlier periods, but a fairly high level of social organization is implied by complex construction and mortuary practices. Many Marksville sites exhibit modified forms of the Hopewellian mortuary complex.

These practices include geometric earthworks, conical burial mounds for the elite, and a unique mortuary ritual system. The erection of conical burial mounds was widespread during early Marksville times. Although they incorporated some elements characteristic of Hopewellian culture, Marksville mortuaries also retained distinctive, localized traits. Large quantities of grave goods are uncommon at Marksville sites, but some items such as Hopewellian-type platform pipes found at Marksville sites were manufactured primarily for inclusion in burials. Mortuary practices became less complex as Hopewellian influence on the culture declined (Smith et al. 1983:171; Speaker et al. 1986:40).

Ceramics generally were manufactured by coiling and were tempered with clay particles and smaller amounts of sand and grit. Early Marksville ceramics of the lower Mississippi River valley do not represent a significant advance in ceramic technology when compared to late Tchefuncte manufacture. There is strong Tchefuncte to Marksville continuity in attributes pertaining to paste and shape. Most new motifs and decorative treatments can be traced to the Illinois River valley, where several roughly contemporary phases produced strikingly similar Hopewell-style pottery (Toth 1977).

Decorative motifs shared by Marksville and Hopewell ceramics include cross-hatching, U-shaped incised lines, zoned and dentate rocker stamping, cord-wrapped stick impressions, stylized birds, and bisected circles (Smith et al. 1983). Cross-hatched Marksville rims and the raptorial bird motif, combined with the tubby pot vessel mode, constitute the most distinctive decoration found in early Marksville ceramics. Judging from recovered whole vessels, the most popular version of the raptorial bird motif was a very stylized representation featuring a long, curved neck and a head inclined upward. A few vessels were colored with a red pigment, presumably hematite, on their exteriors, but most were buff to brown or gray and black.

Utilitarian material culture changed little from earlier periods, reflecting overall continuity in subsistence systems. Other Marksville culture traits include a chipped stone assemblage of knives, scrapers, and drills; ground stone atlatl weights and plummets; bone awls and fishhooks; baked clay balls;

and Gary projectile points. Stone artifacts recovered from Marksville sites include medium to large stemmed projectile points, atlatl weights, chipped celts, and drills (Smith et al. 1983:172). Exotic items, which almost always are recovered from burials, include pearl beads, carved stone effigy pipes, copper ear spools, copper tubes, galena beads, and carved coal objects (Neuman 1984; Smith et al. 1983). Because native copper is not indigenous to the lower Mississippi River valley, copper found at early Marksville sites was imported, presumably in the form of finished products manufactured in the northern Hopewellian centers. The best examples of copper objects are a panpipe and copper earspools from Helena Crossing and copper earspools from the Crooks site (16LA3). Copper-jacketed panpipes, or conjoined tubes, are among the most specialized and diagnostic of all Hopewellian status-related artifacts. Copper earspools are one of the more common artifacts found in mortuary contexts at Hopewellian or Hopewellian-influenced sites in the eastern United States. They take the form of a spool-shaped object, 3 to 6 cm (1 to 2 in) in diameter, which has come to be known as a bi-cymbal copper earspool. These items reflect extensive trade networks and possibly a ranked, non-egalitarian society.

The primary raw materials that may have been imported by early Marksville societies include mica, galena, marine shells, freshwater pearls, large carnivore canines, and greenstone. Some of these items, such as freshwater pearls and carnivore canines, are not necessarily imported, but other items are available only outside the Mississippi River alluvial valley. Only the large marine conch shells were transported great distances to reach the lower Mississippi River valley. Even so, the frequency of imported raw materials found in scattered early Marksville contexts is considerably less than that evident during Poverty Point times.

Marksville sites generally were located on high ground next to rivers or along floodplain lakes. Settlements were located along natural levees of rivers and distributary channels in the Mississippi Valley. Although there are sites along the system of slow-moving secondary streams, settlement no longer was confined mainly to slack-water environments. In fact, many early Marksville sites correlate well with the then-active channel of the Mississippi River (Toth 1977). Most Marksville sites are found in the lower Mississippi River valley along the Mississippi escarpment of Maçon Ridge (Neitzel and Perry 1978; Smith et al. 1983).

Multiple-mound ceremonial complexes usually were situated at the confluence of trunk channels and major crevasse distributary streams. These strategic locations functioned as trade and communication centers, providing ready access to a variety of environmental zones for exploitation of food resources. Satellite residential communities, often featuring a single mound, were situated along the natural levees between stream junctures. Houses were circular, fairly permanent, and possibly earth-covered. Small, seasonal resource procurement sites were scattered around the satellite communities to enhance efficiency in obtaining food resources (Jeter et al. 1989). Relict crevasse splays probably formed favored locations for satellite communities.

The economic base of the culture probably was similar to the hunting, fishing, and gathering subsistence strategy used in earlier periods. Marksville peoples may have been the first in the region to utilize maize (Walthall 1980). Maize and previously domesticated plant varieties, particularly pioneer annuals and other tropical cultigens such as squash and gourd, supplemented intensive riverine subsistence pursuits (Struever and Vickery 1973).

Few Marksville sites are recorded in the coastal zone, and most of these are part of multi-component sites. For example, very few Marksville sites are known around Lake Pontchartrain, possibly reflecting a relative abandonment of the area during Marksville times. Most of Lafourche and Plaquemines parishes do not contain Marksville sites, reflecting the recency of these landforms. Excavations at coastal Marksville sites have been limited to a few mound sites such as Coquille (16JE37), Boudreaux (16JE53), Big Oak Island (16OR6), and Magnolia Mound (16SB49). Data collected at these sites primarily reflect mortuary practices rather than the daily lifeways associated with the Marksville culture (Jeter et al. 1989).

Three tentative phases have been identified in southeastern Louisiana. The LaBranche phase, in the Pontchartrain Basin, is an early Marksville phase usually recognized as a component of earlier Tchefuncte sites. Marksville components at Tchefuncte (16ST1), Big Oak Island (16OR6), and the Little Woods Middens (16OR1 - 16OR5) are recognized as part of the LaBranche phase. The only Marksville site reported in St. Bernard Parish (16SB23) also dates from the LaBranche phase (Wiseman et al. 1979:4-14). The Magnolia phase is a Late Marksville phase identified in the St. Bernard Deltaic Complex, especially along Bayou La Loutre. These sites typically include Coles Creek and Plaquemine components. The Coquille phase, named after the Coquille site (16JE37), tentatively has been identified in the Barataria Basin south of New Orleans. The validity of this phase has not been confirmed (Beavers 1977; Jeter et al. 1989; Phillips 1970).

Troyville-Coles Creek Culture (A.D. 400 - 1100)

Troyville culture, named for the mostly destroyed Troyville mound group (16CT7) near Jonesville in Catahoula Parish, emerged around A.D. 400. This culture, which is contemporaneous with and tied closely to the Baytown culture recognized in adjacent states, represents a brief transitional period in which the waning Marksville culture was supplanted. This period culminated in the development of Coles Creek culture around A.D. 700 (Smith et al. 1983). The concept of a Troyville-Coles Creek period had its origins in the lower Mississippi River alluvial valley cultural tradition. Although sometimes viewed as two distinct periods, Troyville and Coles Creek have similarities and interconnections that warrant their study as a single unit of Louisiana prehistory. Troyville and Coles Creek are virtually inseparable and represent the emergence and development of a characteristically unique culture that had lasting influence on the development of subsequent cultures in the area.

Troyville marks the end of a general subsistence pattern that began in Archaic times. Two technological advances associated with the early part of the Troyville period radically altered prehistoric lifeways: maize agriculture and the bow and arrow (Smith et al. 1983). The appearance of temple mounds and large ceremonial structures reflects the emergence of a priestly social class. Population increased throughout coastal Louisiana, and this increase is reflected in the more numerous, larger, and seemingly more complex sites that appeared by Coles Creek times.

Wetland niches exploited during earlier Tchefuncte times were reinhabited during Troyville-Coles Creek, but subsistence pursuits differed (Gibson 1978). Smaller mammals and larger aquatic reptiles and fish were exploited during the later period. Conjecture persists that the bow and arrow led to a higher hunter success ratio during Troyville-Coles Creek (Gibson 1978). Freshwater, brackish, and saltwater resources were exploited. Mussels, particularly *Rangia* sp., supplemented horticulture and hunting pursuits. Intensive exploitation of plants and slash-and-burn horticulture contributed to sedentism and community autonomy (Gibson 1978).

The number and distribution of Coles Creek settlements dispersed around ceremonial centers increased dramatically compared with the number and extent of previous settlements. Coles Creek peoples practiced swidden agriculture. Subsistence was based in part on maize and other tropical cultigens and was supplemented with a wide variety of other resources. Hunting and gathering activities remained important, as evidenced by the use of the bow and arrow (Smith et al. 1983). Coles Creek peoples were well adapted to the different environments they inhabited, and there apparently was a greater emphasis on internal exchange as opposed to long-distance trade.

Coles Creek sites primarily are located along stream systems where soil composition and fertility were favorable for agriculture (Neuman 1984). Natural levees were desirable locations, particularly those situated along old cutoffs and inactive channels. The predominant characteristic of larger Coles Creek sites is the presence of one or more mounds, often arranged around an open plaza. These mounds typically

are larger, exhibit more building episodes, and are more numerous than the earlier Marksville burial mounds. Most Troyville-Coles Creek mounds are pyramidal and flat-topped and were used as substructures for civic and/or religious buildings. Structures built atop the mounds typically were constructed of wattle and daub. Although burials occasionally are recovered from Coles Creek mounds, the primary function of these mounds apparently was ceremonial. At some sites, the mounds are connected by low, narrow causeways.

The degree of social complexity of the Coles Creek culture can be inferred from the complexity of the mound systems. The presence of these mounds implies the existence of a stable society, with a labor force guided by a centralized authority for construction, maintenance, and utilization of the mounds. The centralized authority probably represented a special religious class who occupied the ceremonial centers; the general population occupied the region surrounding the larger ceremonial centers (Smith et al. 1983:182). Smaller Coles Creek sites, consisting of hamlets and shell middens, normally do not contain mounds.

Increased number and variety of ceramics also reflect increased size and complexity in the culture. Coles Creek culture introduced a new ceramic complex that included a wide range of decorative motifs. Coles Creek Incised, Beldeau Incised, Mazique Incised, and Pontchartrain Check Stamped are types characteristic of the culture. Coles Creek Incised pottery is identified by a series of incised lines set below the rim of the vessel, often accompanied underneath by a row of triangular impressions (Smith et al. 1983:182-183). Vessels generally were larger than those associated with preceding cultures, and Coles Creek decorations normally were restricted to the upper half of the vessel (Neuman 1984).

McIntire (1958) noted that the ceramic features associated with Coles Creek culture are continuations of and elaborations on Troyville wares. For example, the Churupa Punctate and the Mazique Incised designs characteristic of the Troyville culture were used by Coles Creek and Plaquemine pottery makers (McIntire 1958:76). Similarly, French Fork Incised, which formed the basis for many Troyville classifications, continued in use well into Coles Creek times (Phillips 1970).

Troyville-Coles Creek ceramics also show some influence from foreign cultures. Zoned rocker stamping, incised lines, and curvilinear motifs are representative of decorative styles associated with the Florida Gulf Coast. Cord marking and red filming were popular traits commonly used in the central Mississippi area (Smith et al. 1983). Furthermore, pottery styles show regional differences, as Pontchartrain Check Stamped proliferated in the coastal region (Gibson 1978).

Recognized phases in southeastern Louisiana include the Troyville Whitehall phase, the early Coles Creek Bayou Cutler phase, and the late Coles Creek Bayou Ramos phase. South-central Louisiana phases include the early to middle Coles Creek White Lake phase and the late Coles Creek Morgan phase. Roanoke is the recognized Troyville phase in southwestern Louisiana. Welsh corresponds temporally to Bayou Cutler, and the Jeff Davis phase dates from the late Coles Creek period.

Coles Creek culture reached its maximum geographical extent around A.D. 1000. By that time, Coles Creek culture had spread into Arkansas along the Red and Mississippi rivers and into the coastal zone of Mississippi and Louisiana. The indigenous development of the Coles Creek culture, once fully established, provided the contextual background for the emerging Mississippian influences. The terminal date of Troyville-Coles Creek is set around A.D. 1200. There is no sharp division between Troyville-Coles Creek and the cultures that succeeded it.

Plaquemine Culture (A.D. 1100 - 1300)

The Medora site (16WBR1), described by Quimby (1951), represents the type site of Plaquemine culture. This site is a ceremonial center on the Mississippi River floodplain at Manchac Point, south of Baton Rouge. Two mounds at the Medora site were excavated. Based on these excavations, Quimby developed a trait list to characterize Plaquemine culture. These traits included the construction of truncated, pyramidal (platform) mounds in association with an adjacent plaza, mounds built in stages, square or circular buildings (temples) associated with mounds, and a distinctive pottery assemblage characterized by a comparatively high proportion of plain dishpan-shaped bowls, jars with brushed decoration, and plates with interior decoration (Quimby 1951:129).

Available archeological evidence suggests Plaquemine culture was an indigenous development that emerged from a Coles Creek base. The settlement patterns, economic organization, and religious practices associated with Coles Creek culture continued with an intensification of agriculture, sociopolitical structure, and religious ceremonialism. Ceremonial sites with multiple mounds surrounding a central plaza and dispersed villages or smaller settlements (hamlets) are typical of this culture. These settlement patterns remained basically unchanged from earlier Troyville-Coles Creek times (Smith et al. 1983). Site locations favored the natural levees and margins of the alluvial valleys. Wattle and daub houses were rectangular in shape with thatched roofs. Social organization was highly developed, as was maize, bean, and squash agriculture. Salt mining at Avery Island became an important part of the Plaquemine culture. The importance of salt in the trade and subsistence networks of Plaquemine culture continued into the historic period.

Although Coles Creek ceramic traditions persisted, Plaquemine ceramics have distinct features that mark the emergence of Plaquemine culture. Plaquemine Brushed pottery apparently was the most widely utilized design. Post-firing engraving became popular later (Smith et al. 1983). Other types include Harrison Bayou Incised, Hardy Incised, L'Eau Noire Incised, Manchac Incised, Mazique Incised, Leland Incised, and Evansville Punctate. Vessel shape, tempering, and paste appear similar to those associated with earlier cultures. Lithic artifacts are uncommon, but small, stemmed projectile points with incurvate sides are known from some sites (Gagliano et al. 1979).

Another Plaquemine culture ceremonial center reported by Quimby (1957), the Bayou Goula site (16IV11), was situated on the west bank of the Mississippi River, near Bayou Goula, Louisiana. This site, excavated in 1941, consisted of an historic contact component and two platform mounds associated with Coles Creek to Plaquemine cultures. The larger mound, Mound 1, had been constructed in three stages. These mounds appear to have been constructed during prehistoric times, but their practicality may have ceased by the early contact period; however, occupation at the site continued into the early historic period. Initial French contact with the Native American village at 16IV11 probably occurred in 1699, when Iberville explored the Mississippi River or after the 1718 Paris concession (Giardino 1984; Quimby 1957).

Woodiel (1980a, 1980b) describes the St. Gabriel site (16IV128) as a Plaquemine culture ceremonial center located on the Mississippi River natural levee northeast of St. Gabriel, Louisiana. The site included one earthen mound and a largely destroyed adjacent village site. The excavated mound was similar to those excavated at the Medora site (16WBR1) and at Bayou Goula (16IV11). It also was built in stages and in association with buildings (temples). The St. Gabriel site was located near two distinct ecozones, the natural levee of the Mississippi River and the backswamp, allowing inhabitants to exploit a wider variety of faunal and floral resources than would be available in a single ecozone. These food resources included large and small mammals, birds, turtles, fish, persimmon, honey locust seeds, and at least some maize. Woodiel (1980a, 1980b) noted that other prehistoric sites along the Mississippi River were situated in the vicinity of the cutting bank of a meander loop.

Mississippian Culture (A.D. 1000 - 1700)

Late during the prehistoric era, the indigenous Plaquemine culture came under the influence of Mississippian culture from the middle Mississippi River valley. Mississippian cultural influence extended from the upper portions of the lower Mississippi River valley, across northern Mississippi and western Tennessee, into central North Carolina and north into the Great Lakes region (Haag 1971). Mississippian culture continued to impact the lifeways of inhabitants of Louisiana right up to historic contact. Mississippian sites in Louisiana typically are found on the extreme southeast coast and in an isolated pocket in the northeastern part of the state.

Mississippian culture is characterized by the emergence of hierarchically ranked societies, nucleated villages organized around large mound centers, intensive agriculture based on three principal crops (maize, beans, and squash), broad interregional trade networks, and a wide range of artifacts showing a diversity in form and function.

The Mississippian subsistence pattern was based on a three-part strategy: the cultivation of maize, beans, squash, and pumpkins; the collection of local plants, nuts, and seeds; and fishing and hunting of local faunal species. Mississippian settlement patterns reflect this diversity of subsistence activities. Major Mississippian sites were located on sandy and light loam soils in the fertile bottomlands of major river valleys. A typical Mississippian settlement consisted of an orderly arrangement of village houses around a truncated pyramidal mound. Such mounds were characteristic of Mississippian settlements and served as platforms for temples or for the houses of the elite. Mound arrangements imply community planning, a strategy only possible under a highly organized and complex social system.

Mississippian pottery is distinguished by its shell tempering, a technological innovation that enabled potters to create larger vessels (Smith et al. 1983:203). Globular jars, plates, and bottles, as well as loop- and strap-handled pots were common vessel types. Decorative techniques include negative painting, engraving, and incising, and modelled animal heads and anthropomorphic images were used as adornments. Other Mississippian artifacts include chipped and ground stone tools; shell items such as beads, gorgets, and hairpins; and copper and mica items.

Historic Contact

The De Soto expedition (1541 - 1542) represents what probably was the first European contact with the Native Americans of Louisiana. However, little substantive data about indigenous lifeways was recorded at that time (Kniffen et al. 1987:44). Later, in 1682, René Robert Cavelier, Sieur de la Salle, recorded tribal identities and locations of Louisiana Native Americans during his voyage down the Mississippi from Canada. He noted five Native American linguistic groups occupying southern Louisiana: Natchezan, Muskhogean, Tunican, Chitimachan, and Atakapan.

In 1699, Pierre le Moyne, Sieur d'Iberville, explored the Mississippi River and established a fort on the river in 1700. The Washa first were encountered on Bayou Lafourche by Iberville. The Chawasha (Chaouacha), identified as a small group living in the area, apparently took part in a raid on an English vessel anchored at English Turn in 1699 (Goodwin et al. 1986:68). By the time Charlevoix passed through the area in 1722, the Chawasha had moved to the east bank further downriver.

When Europeans arrived on the continent, Native Americans were characterized as semi-sedentary agriculturalists living in small villages, although they continued to hunt, fish, and gather a variety of floral resources. European colonization quickly altered Native American culture. Old World diseases such as measles and smallpox decimated Native American populations, some tribes relocated to other states, and some united with other tribes in the region (Smith et al. 1983).

CHAPTER IV

PREVIOUS INVESTIGATIONS IN THE PROJECT AREA

Prehistoric Sites in the Vicinity of the Project Area

No previous investigations yielding evidence of prehistoric occupation have been conducted within 1.6 km (1 mi) of the Meraux Tract in St. Bernard Parish, Louisiana. The recorded prehistoric sites located nearest to the project area are Site 16SB67, approximately 2.9 km (1.8 mi) from the project area, and Sites 16OR40, 16OR41, and 16OR55, approximately 5.6 km (3.5 mi) from the project area.

Site 16SB67 first was recorded by Neuman (1974) and described as a small camp dating from the Mississippian period. The site is located atop a natural levee along the relict channel of a Mississippi River distributary. Survey methodology included surface collection and shovel testing. Artifacts recovered from the site included an unknown quantity of ceramic sherds identified as possibly related to the Plaquemine culture; artifact density, however, was described as light.

Site 16OR40 is located along the south side of the Intracoastal Waterway/Mississippi River-Gulf Outlet (MRGO) approximately 490 m (1,600 ft) east of Paris Road in Orleans Parish. Originally, the site had been situated on the crest of the natural levee of a small crevasse splay originating from a Bayou Sauvage cutbank that had been buried subsequently by marsh deposits. The site consisted of a *rangia* midden exposed after construction of the MRGO. Radiocarbon dates placed the site in the Bayou Jasmine/Garcia phase of the Poverty Point period (Wiseman et al. 1979).

Site 16OR41 lies 150 to 300 m (500 to 1,000 ft) south of the MRGO and approximately 490 m (1,600 ft) east of Paris Road. This site also was situated on the crest of the natural levee of a crevasse splay originating from Bayou Sauvage; it subsequently was covered by over 1.5 m (5 ft) of marsh deposits before it was exposed by a dragline during the construction of a bridge approach in 1964. The site consists of a *rangia* shell midden, and the associated artifacts date from the Tchefuncte period. The site was largely destroyed by dredging, and if any portion of the site survives, it is buried under at least 1.5 m (5 ft) of overburden (Pearson 1983:47).

Site 16OR55 was located in spoil dredged from the MRGO approximately 0.8 km (0.5 mi) west of Paris Road. The site probably extended along a relict levee for a distance of 0.8 to 1.2 km (0.5 to 0.7 mi). A carved atlatl weight, as well as several fragments of bone, were collected from the site, which may date from the Poverty Point period.

Historical Sites in the Vicinity of the Project Area

Numerous historical sites are located within 1.6 km (1 mi) of the project area along the Mississippi River waterfront away from the backswamp setting of the Meraux Tract project area. These sites include Site 16SB145, the Three Oaks Plantation site; Sites 16SB107 - 16SB117, a series of nineteenth and early twentieth century residences and commercial buildings in two blocks of North Peters Street in Arabi (Iroquois Research Institute 1981); and Site 16SB147, the Chalmette National Historical Park. The latter is the site of the decisive American victory over British forces in 1815 known as the Battle of New Orleans; it is located directly south of the project area on the opposite side of St. Bernard Highway. Because of the proximity of the battlefield to the project area, careful consideration shoul be paid to the possibility of associated properties within the project area.

The Battle of New Orleans and the War of 1812 (1812 - 1814) have figured prominently in the historical literature; archeological research at the site has occurred sporadically since 1957, and previous archeological investigations at Chalmette National Historical Park are summarized in Hinks et al. (1991), which documents a largely unsuccessful attempt to recover evidence of the American defensive line and Battery No. 3, manned during the battle by Dominique You and his band of Baratarian buccaneers.

Previous archeological excavations at the battle site have focused on locating features, such as the American defensive rampart (Birkedal et al. ca. 1985; Wilson 1965), a possible British mass grave (Birkedal et al. ca. 1985), and the Rodriguez House (Birkedal et al. ca. 1985), or on conducting pre-construction impact assessment surveys (Goodwin and Yakubik 1983; Noble and Goodwin 1987; Shenkel et al. 1976; Stuart and Greene 1983). Interestingly, limited archeological testing conducted by the National Park Service prior to the construction of a bathroom facility resulted in the discovery of a large, previously unknown plantation house dating from ca. 1760 - 1790 (Noble and Goodwin 1987).

Results of the most recent investigations at the park were disappointing; they revealed that archeological evidence of the American defensive line have not been identified (Hinks et al. 1991:111). Fieldwork consisting of the excavation of nine excavation units, two auger tests, and four backhoe trenches in the project area along the Rodriguez Canal were used to search for Battery No. 3. This testing concluded that a large, filled hole, nearly three times as large as the reported size of the battery, may represent the deflated and eroded location of Battery No. 3. Paling alignments, earlier thought to be remains of the "rear parapet," were found to be associated with mid to late nineteenth century deposits, thus rendering it impossible for them to be correlated with the 1815 battle. Recommendations included that future investigations de-emphasize attempts to locate remains of the American rampart, except at its northernmost end, where there is no reconstructed rampart and less post-battle disturbance (Hinks et al. 1991:112). Thus, it becomes critical to the present project to ascertain where the northern limit of the rampart lies in relation to the proposed area of impact. This issue is discussed in detail in Chapter V.

Previous Archeological Survey Within the Project Area

Prior to December, 1984, R. Christopher Goodwin & Associates conducted a Phase I cultural resources survey of the proposed Riverway Gas Pipeline Company 16 in - 20 in O.D. pipeline right-of-way and valve platform located in Orleans and St. Bernard parishes, Louisiana (Yakubik and Goodwin 1984). The Yakubik and Goodwin (1984) survey area included a portion of the currently proposed project area. Pedestrian survey failed to identify any cultural resources, however, Yakubik and Goodwin (1984) reported that portions of the proposed pipeline corridor were located adjacent to Jackson Barracks (a National Register property) and the historic military lines within the Chalmette Plantations area. Yakubik and Goodwin (1984) stated that both of these proposed pipeline segments were located within previously disturbed right-of-ways and would have no adverse effect on the adjacent historic period resources. No additional testing of the proposed pipeline right-of-way was recommended.

CHAPTER V

THE PROJECT AREA IN HISTORICAL PERSPECTIVE

Throughout much of its history, the Meraux Tract project area has consisted of acreage that has remained unimproved or has been covered by cypress swamp. The tract, however, encompasses the outskirts of the Languille and Macarty plantations; both plantations figured prominently in the 1815 Battle of New Orleans. Languille Plantation served as a staging area for some of the American troops fighting to defend New Orleans. Similarly, Maj. Gen. Andrew Jackson established his headquarters at Macarty Plantation, a mansion once located near the banks of the Mississippi River. Neither the staging area nor the mansion fall within the current project area. It appears that most of the area was blanketed by a cypress swamp at the time of battle.

The Project Area, 1723

The *Carte Particuliere du Flevue* [sic] *St. Louis* (1723), one of the more important maps illustrating the development of the Louisiana colony, depicts the locations of numerous plantations constructed along the Mississippi River soon after the French began to settle the area. In his examination of the map, Samuel Wilson, Jr., the preeminent architectural historian of Louisiana, suggested that Macarty Plantation (as well as the project area) occupied the tract originally claimed for John Law, a Scottish speculator. By 1723, Monseigneur Claude LeBlanc, a French minister of state, held the concession (Figure 7) (Wilson 1965:6). The map indicates that many of the officials who supervised the settlement of the Louisiana colony obtained large land grants along the Mississippi River as a reward for their service. Apparently, neither Law nor LeBlanc ever visited Louisiana.

Following a precedent established by France in Canada, the founders of Louisiana followed the so-called linear plan, an arrangement of land grants fronting on the river and usually extending 40 arpents (1.4 mi) into the interior. The 40 arpent depth land grant fronting on the Mississippi River reached into but did not completely envelop the current project area.

The Site of the Languille Plantation, 1743 - 1994

A tract of land long identified with the Languille family, who owned it throughout most of the nineteenth century, lies immediately upriver from the Macarty Plantation and includes a segment of the current project area. In 1743, Jean François Gauthreau, General Guardian of the King's Warehouse in New Orleans, sold the property to Pierre François de Rigaud Cavagnal, Marquis de Vaudreuil, who had arrived recently in New Orleans to assume the governorship of Louisiana. According to historian Edwin A. Davis, the Marquis "had elegant manners, enjoyed giving magnificent dinners and balls, and loved formal ceremonies and military displays. Throughout his governorship, he maintained in New Orleans a fashionable little court which attempted to copy the elegance and fashion of the French court at Versailles" (Davis 1971:66).

In 1744, the year following his purchase of the plantation, Vaudreuil reported that its buildings included a dovecote with about 100 pigeons. He described his slaves as 34 "strong well-made negroes," and his livestock numbered 57 oxen and cows and an almost equal number of sheep. The plantation contained 10 brick vats to process indigo and "180 arpents of grubb'd up, tilled land ploughed and sowed" (Wilson 1965:12). According to Vaudreuil, "Provisions being dear occasioned my buying this plantation,

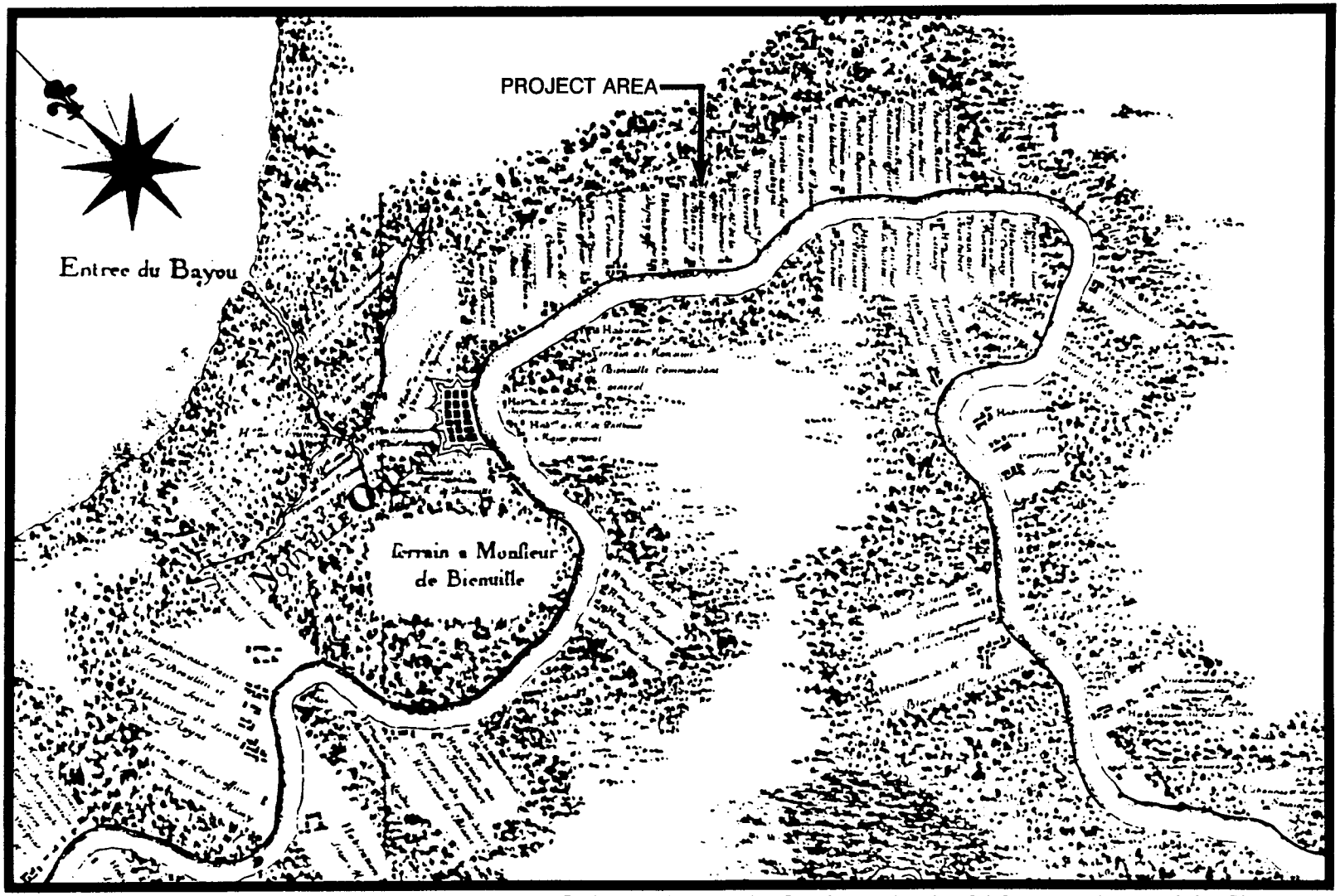

Figure 7. [ca. 1723] Excerpt from *Carte Particuliere du Flevue St. Louis*, showing the Carrière and Delos [sic] concessions and the Chouachas village and cabins below *Detour des Anglais* (Edward E. Ayer Collection, Newberry Library, Chicago).

and if you live in this place you must have one; besides, I had it almost for nothing. . . . I think I have made a good bargain" (Wilson 1965:12).

When he relinquished the governorship in 1753, Vaudreuil sold the plantation to Antoine Bienvenu. The new owner petitioned the colonial government to grant him, in addition to the 40 arpents depth, all the land between his river frontage and Lake Borgne (Wilson 1965:9-12).

François Balthazar Languille, a native of Paris, purchased the plantation from the succession of Antoine Bienvenu in 1803-1804, just when the United States acquired Louisiana. The American authorities confirmed the Languille title to the Bienvenu plantation with frontage on the river measuring eight arpents and nine toises (about 488 m [1,600 ft]) and a depth of 40 arpents. Nevertheless, for lack of supporting evidence, the United States denied the Languille claim to the land between his 40 arpents depth and Lake Borgne (Wilson 1965:9).

One source, a map entitled "Plan of the Attack and Defence of the American Lines below New Orleans on the 8th January 1815," depicts the Languille house as the headquarters for Capt. Peter V. Ogden and his cavalry company during the Battle of New Orleans. At the rear of the house, Brig. Gen. John Adair assembled his command on January 7, 1815, i.e., on the eve of battle. The house, however, lies outside the current project area (Figure 8).

Languille subdivided and sold the upriver segments of his property; however, the Languille family still retained ownership of the lower portion of the plantation. Jean François and Pierre Joseph Languille, the sons of François Balthazar Languille, inherited the family plantation in 1828, and the 1830 census reports two white males, aged 20 to 29, in residence at the plantation (United States Bureau of the Census [U.S. Census], Population Schedules, St. Bernard Parish 1830).

By the 1830s, Sylvain Peyroux consolidated his ownership of all the upriver segments that the Languille family had sold from their plantation. When the United States surveyed the project area, the Languille brothers and Sylvain Peyroux on June 15, 1832, obtained a patent to the 222 ac (89.8 ha) in Section 64, T12S, R12E (COB 16, Folio 5, Patent, St. Bernard Parish Courthouse). The patent provided the Languilles and Peyroux with title to an additional 40 arpents beyond the prior 40 arpent units; thus, the Languille and Peyroux plantations officially extended to a depth of 80 arpents from the Mississippi River.

The 1834 Charles Zimpel map of New Orleans and its vicinity depicts the Languille and Peyroux plantations with their newly acquired holdings. The Languille Plantation, as depicted, extends completely through a segment of the current project area. The map also depicts the plantation houses and gardens located beside the river, and shows outbuildings and a large brickyard to the rear of the Languille house (Figure 9) (Zimpel 1834). These facilities lie outside the project area. The brickyard probably served as a more important source of income than any of the agricultural operations. Although sugar production emerged as the chief source of agricultural wealth in southern Louisiana, the *Statement of the Sugar Crop* in the 1850s indicates that neither cane cultivation nor sugar manufacture occurred on the Languille Plantation (Champomier 1850-1862).

Jean François and Pierre Joseph Languille remained in St. Bernard Parish through the Civil War. After federal troops captured New Orleans, the U.S. Army, Department of the Gulf, prepared its Map #5, entitled *Approaches to New Orleans*. The map includes the project area and mistakenly identifies "Langley" rather than Languille Plantation. The map also shows the "Pereaux" Canal, which must have been built by Sylvain Peyroux, whose property fell just upriver from the project area (Figure 10) (Abbot 1863). The St. Bernard Parish census of 1870 indicated that the Languille brothers, both over 60 years of age, still lived on their acreage until they died in the 1870s (U.S. Census, Population Schedules, St. Bernard Parish 1870:396). Their property remained in the family in a complicated succession that ultimately resulted in the division of the acreage into two tracts, upriver and downriver. Although the 1874 Mississippi River

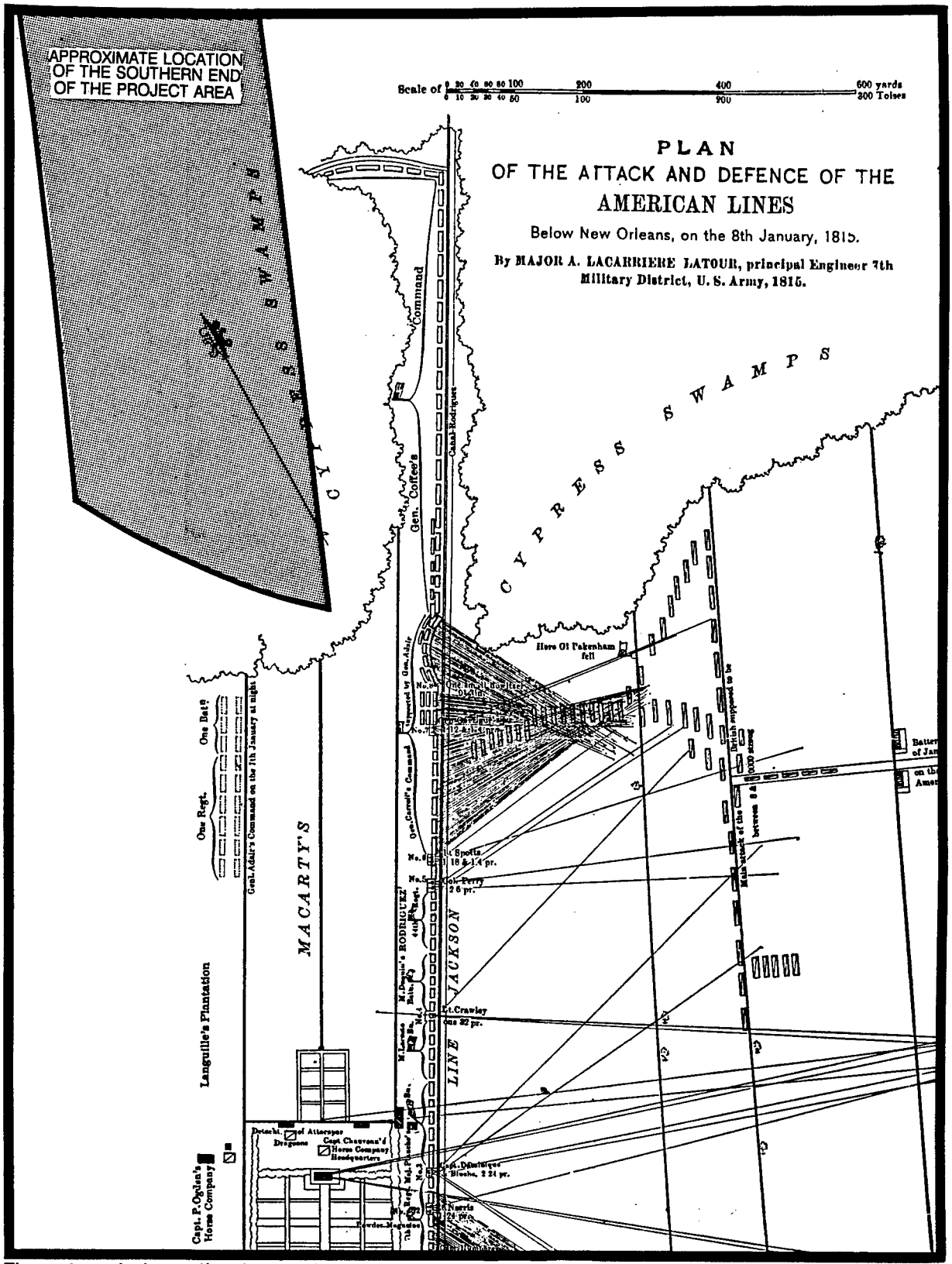

Figure 8. A. Lacarrière Latour, "Plan of the Attack and Defence of the American Lines below New Orleans, on the 8th January, 1815" in Latour's *Atlas, Historical Memoir of the War in West Florida and Louisiana*, first published in 1817. Superimposed on the map, a shaded area represents the approximate location of the southern end of the project area. The map also indicates the Languille and Macarty plantations, the Line Jackson, and the position of Gen. John Coffee's Tennesseans, who guarded the left of the line and the approach to the project area.

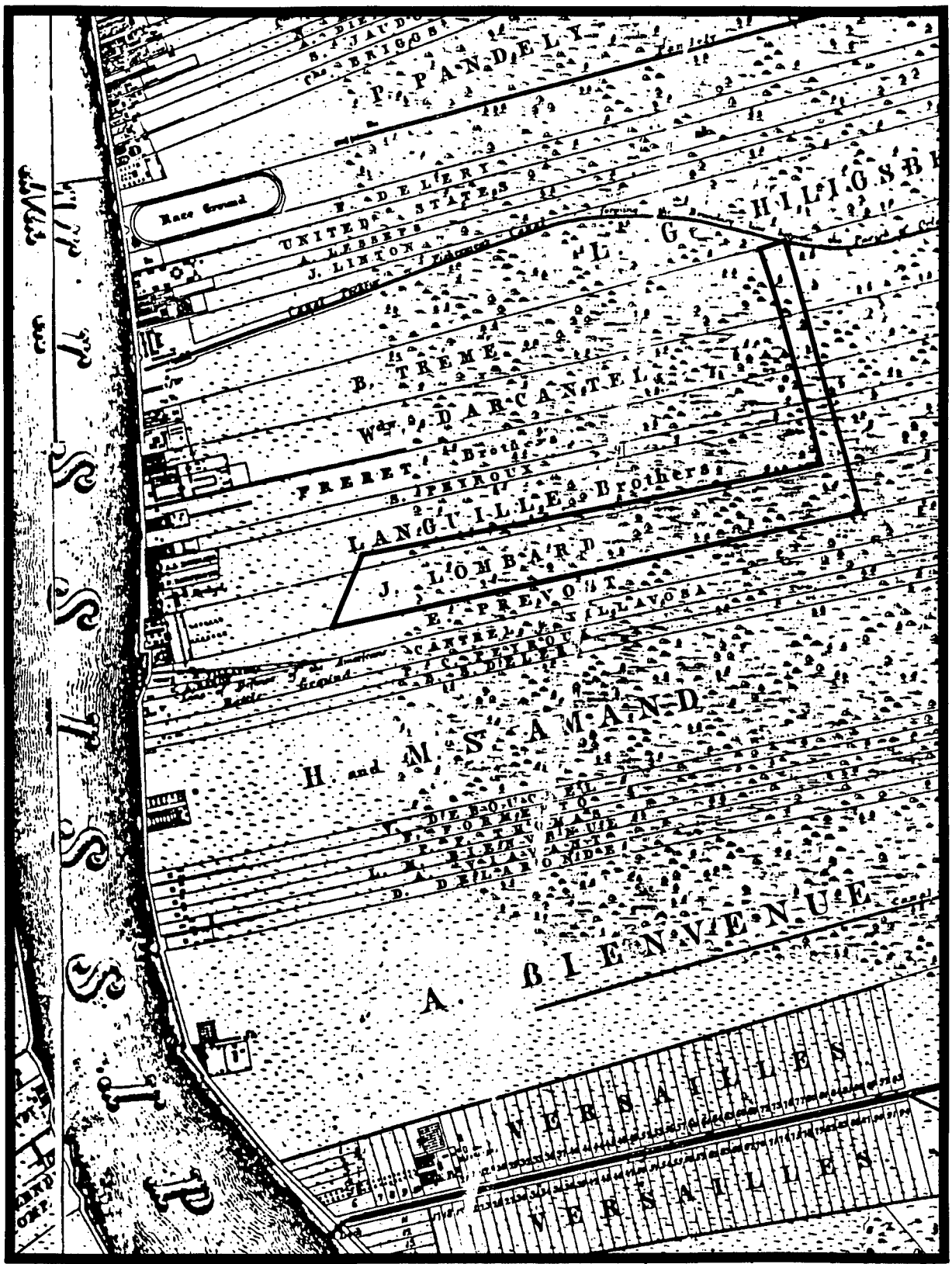

Figure 9. An excerpt from Charles Zimpel, *Topographical Map of New Orleans and Its Vicinity*, 1834 (Map Division, Library of Congress, Washington, D.C.). The map indicates the locations of the Peyroux, Languille, and Lombard (formerly Macarty) plantations. Superimposed on the map, lines indicate the location of the project area.

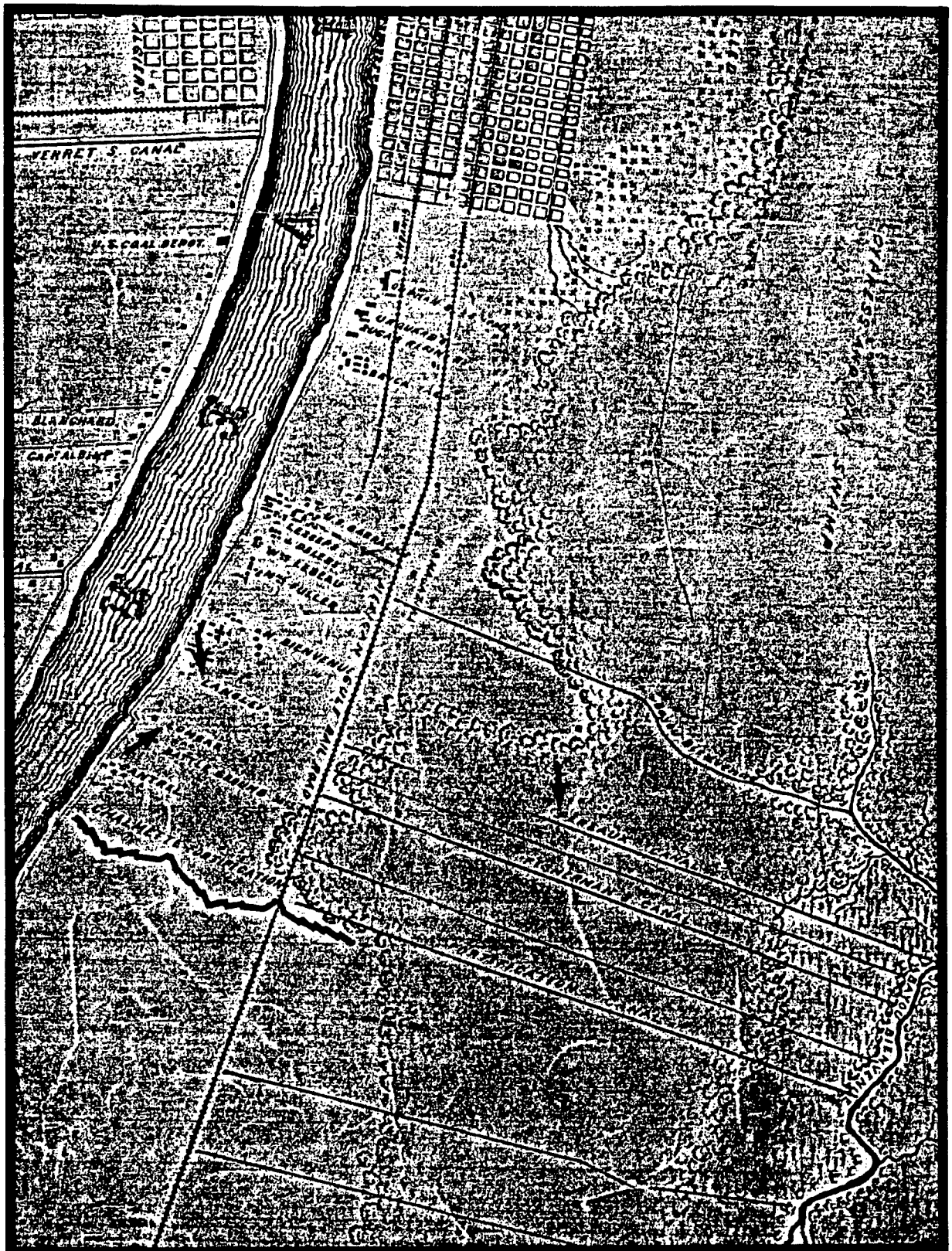

Figure 10. An excerpt from Henry L. Abbot, Chief Topographical Engineers, *Approaches to New Orleans, February 14, 1863*. Department of the Gulf, Map No. 5. Prepared by order of Maj. Gen. N. P. Banks. National Archives, Washington, D.C. Superimposed on the map, arrows indicate the Pereaux (Peyroux) Canal, just above the project area; the so-called "Lombar" (Lombard, formerly Macarty) plantation; and the "Langley" (Languille) place.

Commission (MRC) Map #76 assigns the upriver tract to "A. Langville" (probably Adolphe Languille), the widow of Jean François Languille actually lived on the property. The upriver tract lies outside of the current project area.

Zuliné Languille, wife of Ferdinand Gueringer, inherited the lower tract, although the 1874 MRC assigns the tract to F. Gueringer. The Gueringer tract includes a segment of the project area. According to the MRC, no agricultural activity occurred on the their rural property. Although modern maps corrupt the spelling to "Guerengeh," the canal that forms the upriver boundary of the project area still bears the name of Gueringer. In 1874, rather than residing on their rural acreage, the couple lived at the dry goods store Gueringer owned at 184 Camp Street in New Orleans (Soards 1874). Like the 1874 MRC, the 1895 MRC assigns ownership of the upper tract of the former Languille Plantation to "A. Langville," probably Adolphe Languille. Although the map failed to identify the owner of the lower tract, Zuliné Gueringer (widowed since 1894) continued to own the property until early in the twentieth century (COB 20, Folio 177, St. Bernard Parish Courthouse).

By 1904, the New Orleans Terminal Company purchased all the acreage formerly held in the Languille and Macarty plantations, including the current project area (COB 20, Folio 251, St. Bernard Parish Courthouse). The terminal company in 1907 and 1908 constructed the so-called Chalmette Slip, a deep water shipping terminal; this construction subsequently destroyed the site of the Languille plantation house and brickyard and the Jackson headquarters at the Macarty house (National Park Service 1989). The company abandoned the Chalmette Slip in 1912, but it has since reopened (Wilson 1965:16, 18, 32). The 1921 MRC Chart 76 depicts the Chalmette Slip, but this chart does not include the project area.

In 1925, the New Orleans Terminal Company sold the property to Louis Anthony Meraux and Albert Sidney Nunez, who formed a corporation the following year (COB 33, Folio 211; COB 34, Folio 486, St. Bernard Parish Courthouse). The project area remained largely undeveloped during the severe economic depression that began in 1929 and continued during World War II (1939 - 1945). In 1948, however, Meraux and Nunez sold an upriver portion of the project area to Mrs. George Wiltse. In 1949, Wiltse sold a two-thirds interest of her portion to Daniel Bell and Floyd Raymond Jones. In the same year, the three landowners began construction of the St. Bernard Drive-In Theater (COB 53, Folio 61, St. Bernard Parish Courthouse). After flourishing for a time, the enterprise eventually failed. The site has been razed in recent years, and the only trace of the theater that exists today is the chain-link fence located beside the Guerenger Canal.

Judge Perez Boulevard, an extension of Claiborne Avenue into St. Bernard Parish, dates from the 1960s. Several structures of recent origin are situated along the boulevard as it traverses the Wiltse, Bell, and Jones property in the project area. On the northern (lake) side of the boulevard stands Moon's St. Bernard Tire Service (ph. 271-6201) next to the canal at 7701 Judge Perez Boulevard. Next to Moon's and to the east (downriver), Arabi Wholesale Used Cars (ph. 275-1557) maintains a lot with a temporary building that serves as an office at this 7703 Judge Perez address. At 7713 Judge Perez Boulevard is Boyd Breaux's Marine Engine Service. An unidentified structure, possibly a residence, is located at 7717 Judge Perez, and a wooden shed adjoins this building. Farther east, a two-track road extends north from Judge Perez into the project area. On the east side of the road, a rusted, probably unused garbage dumpster sits next to an open field. Two large towers supporting billboards sprout from the field north of Judge Perez, but it is unclear whether they fall within the limits of the project area. All of the structures described in this paragraph are situated along the north side of Judge Perez Boulevard and east of Guerenger Canal. All of the buildings appear to lie within the project area.

On the south (river) side of Judge Perez Boulevard, next to and east of Guerengeh Canal, Bodyshop, Inc., occupies 7710 Judge Perez. Immediately east (downriver) of Bodyshop, Inc., Pepe's Lounge is located at 7714 Judge Perez. Just east of Pepe's Lounge stands the Finish Line Off Track Betting establishment at 7718 Judge Perez. This betting parlor appears to be a relatively recent addition.

At noon on Wednesday, August 17, 1994, the parking lot held 20 to 30 vehicles, and the parking area appears to accommodate approximately 200 vehicles. Open field lies east of the Finish Line. As Judge Perez Boulevard extends through the project area, a sewer line extends parallel to the south, and two more billboard towers lie in the field. It is unclear whether the billboards lie within the limits of the project area.

The Site of the Macarty Plantation, 1790 - 1994

Just below the Languille Plantation and extending into the project area, the so-called Edmond Macarty Plantation has undergone a series of changes in ownership. In June 1790, the tract belonged to Espiritus Liotaud (Lieutaud?) and August Faure. In the last decade of the eighteenth century, Pierre Denis de La Ronde acquired the plantation, but he sold it on December 23, 1800, to Laurent Sigur. Sigur in turn sold the property on January 5, 1804, to Simon Ducourneau, who the same day sold the plantation to Philip Lanaux. According to the original government survey, Philip Lanaud (*sic*) obtained title to Section 76, T12S, R12E, which afforded his plantation a depth of 80 arpents from the Mississippi River and enveloped most of the project area (Surveyor General Louisiana 1873).

Edmond Macarty bought the plantation from Lanaux on February 17, 1807 (Wilson 1965:18-19). Of Irish Catholic origin, the Macartys had migrated to Louisiana during the eighteenth century and were leading traders and shippers in the Crescent City during the era of the American Revolution. Edmond Macarty built a new and elaborate plantation house on the property before the War of 1812. Whether he ever occupied the mansion is unclear, but he died on November 13, 1814, soon after his thirtieth birthday. Two weeks later, Andrew Jackson arrived in New Orleans and by Christmas Day 1814 had chosen the Macarty plantation house to serve as his headquarters. Heavy British artillery fire damaged the house and forced the Jackson staff to seek cover elsewhere, but the American general retained the mansion as his nominal headquarters until after the Battle of New Orleans on January 8, 1815. Tradition holds that he used an old telescope to observe enemy movements from a dormer window located on the top floor of the plantation house (Wilson 1965:22).

Not until after the dust settled from the battle did the probate court order an inventory of the Edmond Macarty property. Dated March 1, 1815, the inventory described the plantation as being 1.25 leagues below New Orleans. The frontage on the river measured three arpents, 26 toises, and five feet. The plantation had a depth of 80 arpents, which included the downriver portion of the project area (Wilson 1965:22). As a probable result of the recent battle, the inventory listed the plantation buildings as being in poor condition and the establishment totally lacking in fences. (The American forces had used the fenceposts for palings along their earthen parapets.) At the time of the inventory, the plantation house stood empty, for all of the furniture was inventoried in the house on Conti Street in New Orleans owned by the father-in-law of Edmond Macarty (Wilson 1965:22-23).

Although she wished to continue operation of the plantation, Marie Eleanore Destrehan, the widow of Edmond Macarty, died before the end of 1815, and her only son expired the following year. William W. Montgomery bought the plantation at auction on April 14, 1817, from representatives of the only surviving child of Macarty, a little girl named Myrtice. A notary, Michel de Armas, registered the act of sale on April 30 (Wilson 1965:24-26). Well aware of the historic character of his dwelling, Montgomery intended to embellish his mansion and create a showplace – he even went as far as to gild the cannonballs imbedded in the walls of the house. Restoring the French gardens to there original design (probably of Hyacinthe Laclotte) took considerable efforts, laborers found hundreds of cannonballs about the place and the Americans utilized a corner of the garden to construct a redoubt (Wilson 1965:24-27).

The former Jackson headquarters and the battlefield attracted numerous visitors throughout the nineteenth century. The Marquis de Lafayette, on a farewell tour of America, visited the site in 1825.

William Montgomery served as host to Lafayette and remained in residence at the plantation with his large family throughout the decade (U.S. Census, Population Schedules, St. Bernard Parish 1830).

In 1832, James Lombard purchased the former Macarty Plantation. He died soon thereafter, and his widow received the property by adjudication in 1833 (COB 16, Folio 112, St. Bernard Parish Courthouse). The 1834 Charles Zimpel map still indicates Joseph Lombard as owner of the historic site (Zimpel 1834). Indices to the census indicate that the Lombards did not reside in St. Bernard Parish. In fact, the Lombard family is associated prominently with historic structures still standing in the Faubourg Marigny and Bywater districts of New Orleans. In 1838, the widow of Joseph Lombard built a house on Royal Street in town (Toledano et al. 1974:89-91, 164).

As the nineteenth century progressed, the houses located on the New Orleans battlefield tended to be used as retreats for city dwellers rather than seats of working plantations. The Americans had selected the defensive position before the battle in part because of the narrow distance between the river and the cypress swamp. As a result, the site had far less cultivable land than the plantations downriver, where the British encamped (Latour 1964:145-146). The *Statement of the Sugar Crop*, 1850-1862, indicates neither cane cultivation nor sugar manufacture occurred on the Macarty Plantation (Champomier 1853-1854:21, 42).

The widow of Joseph Lombard continued to own the Macarty Plantation through the Civil War. The U.S. Army Map #5, *Approaches to New Orleans*, depicts the "Lombar" plantation as being just upriver from the "Battle Ground 1815" (Figure 10) (Abbot 1863). Below the site of the battle of 1815, and considerably removed from the project area, the map depicts a line of fortifications with which Confederate forces had hoped, in vain, to defend New Orleans.

During the Reconstruction era, Mrs. Lombard apparently rented the property to Dr. Maximilaux F. Bonzano, who maintained a townhouse in New Orleans where he was employed by the office of the U.S. Surveyor General (Soards 1874). The 1874 MRC affixes Dr. Bonzano to the former Macarty Plantation, but Bonzano did not actually purchase the property from the succession of Mrs. Lombard until 1879 (Figure 11).

According to the 1874 map, Dr. Bonzano cultivated a narrow strip of corn or wheat near the river; grass and cypress swamp covered the remainder of the property. With the purchase of the plantation in 1879, Bonzano began to cultivate rice and produced 358 barrels in 1880 (Bouchereau 1880:40). According to a 1879 guidebook, the plantation also served as a tourist attraction (Wilson 1965:29-30).

By 1894, proprietorship of the former Macarty Plantation had passed from Dr. Bonzano to Henry L. Beauregard, son of the Confederate general P. G. T. Beauregard. Rene Beauregard, the brother of Henry, owned a country residence just downriver that still stands on the former battlefield in the Chalmette National Historical Park. On February 22, 1896, under the ownership of Henry Beauregard, fire destroyed the old Macarty Plantation house. A spark from the chimney set ablaze the former Jackson headquarters. According to Samuel Wilson, Jr., some accounts suggest that the house may have been rebuilt.

Nevertheless, the New Orleans Terminal Company purchased the former Macarty and Languille plantations, including the project area, by 1904. In 1907, the terminal company constructed the Frisco terminal freight sheds (as the Chalmette Slip then was known), which necessitated the dismantling of any surviving buildings located on the Macarty property. Furthermore, at the time the slip was constructed, the U.S. Army Corps of Engineers set the levee back (Wilson 1965:28-32). The former house site now coincides with the Chalmette Slip (National Park Service, U.S. Department of Interior 1989).

In 1925, the New Orleans Terminal Company sold the project area to Louis Anthony Meraux and Albert Sidney Nunez, who in 1926, formed a corporation for their holdings. Although the two landowners

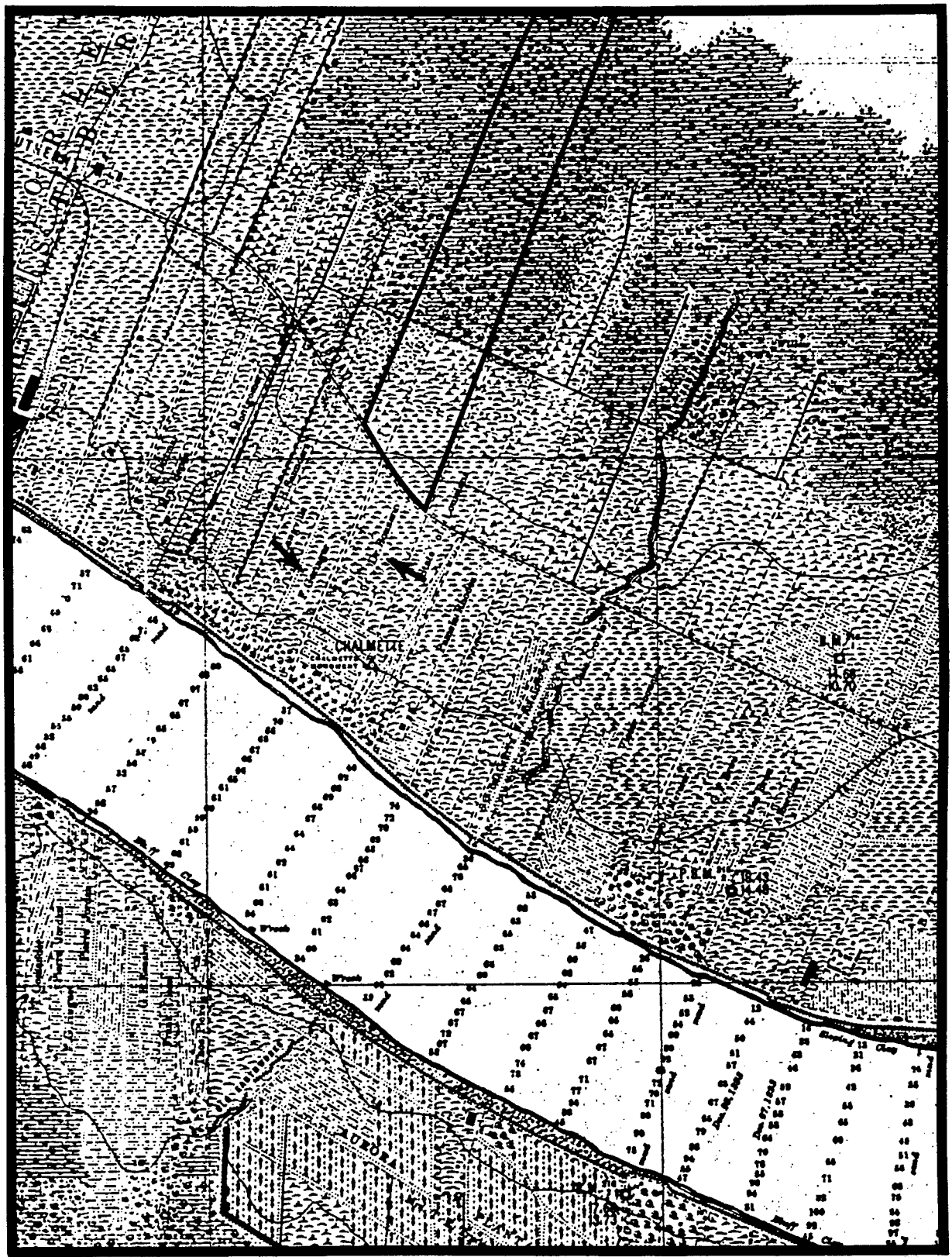

Figure 11. An excerpt from Chart 75, Mississippi River Commission, *A Survey of the Mississippi River,* 1874. Arrows indicate references to "F. Geringer" and "Dr. Bonzano"; lines indicate the location of the project area.

sold a portion of the property to Wiltse, Bell, and Jones, they retained the downriver portion of the project area. During the early 1940s, the downriver portion of the project area was utilized as a rifle range. Sponsored by organized units of the National Rifle Association, the New Orleans Rifle Range provided target practice and served as a training ground for the police and National Guard (Hansen 1971:481).

In 1950, the Meraux Tract was utilized briefly as the site of an airport. During that year, a map illustrating land development in metropolitan New Orleans depicts one runway at this location (Metropolitan New Orleans 1950). As late as 1961, local maps indicate an "airport road" on the property; however, since that time, the road has disappeared. Although the airport was relocated several miles downriver to the community of Meraux, legal records in St. Bernard Parish sometimes refer to the project area as "the airport property."

Just below the project area and to the east on the St. Bernard Highway, Marvin Corne operated from the late 1950s to the late 1970s a miniature golf course, St. Bernard Carpet Golf. Emile Corne, Sr., of Chalmette, helped his brother Marvin build on the miniature course a 3 m (10 ft) high, cement block replica of the 30.5 m (100 ft) high marble-faced monument in the Chalmette National Historical Park commemorating the Battle of New Orleans. Players of carpet golf had to hit a ball through a pipe at the base of the cement block replica to reach the hole. Although the miniature golf course closed its operations, the cement block monument still remains on the leased property. The current owner, Arlene Meraux, regards it as a local attraction worth preserving (Cannizaro 1994).

The Florida Walk Canal and the Back Protection Levee

The Florida Walk Canal and the Back Protection Levee form the northern (lake side) boundary of the project area. According to Jerry Gillen, an engineer with the New Orleans Levee Board, which has jurisdiction over the levees in St. Bernard Parish, the Florida Walk Canal dates from 1895, when the Southern Railway granted the canal right-of-way through the railroad property (Jerry Gillen, personal communication, September 26, 1994) (Figure 12). The Florida Walk Canal derives its name from Florida Avenue, which was known as Florida Walk until 1923 (Chase 1979:137-138). A New Orleans street, Florida Avenue, stops at the boundary of Orleans Parish. The Florida Walk Canal follows the path the avenue would have taken if it were extended into St. Bernard Parish.

For many years, the Jackson Protection Levee, located north of the project area, provided the only shield from flooding from the lake side. During the 1960s, however, the New Orleans Levee Board constructed the Back Protection Levee adjacent to the Florida Walk Canal (Jewel Fulcher, personal communication, September 21, 1994).

The Mexican and Gulf Railroad and Its Successors, 1837 - 1994

The tracks of the Mexican and Gulf Railroad originally formed the southern (river side) boundary of the project area. The railroad originated during the antebellum era. During the railroad boom in 1837, on the eve of an international economic panic, a group of promoters in St. Bernard Parish chartered the Mexican and Gulf line. The promoters proposed to connect New Orleans by rail to the entrance of Lake Borgne. This connection supposedly would give the Crescent City an alternative to the treacherous navigation of the lower Mississippi River.

Funded by a loan from the state and a $30,000.00 grant from the City of New Orleans, the company began construction in 1839 by laying tracks down Good Children Street (now St. Claude) in New Orleans. The line ran beyond the city limits and just below the project area. However, the company ran out of money with only 30.6 km (19 mi) of track constructed. Construction was stopped, and the line never

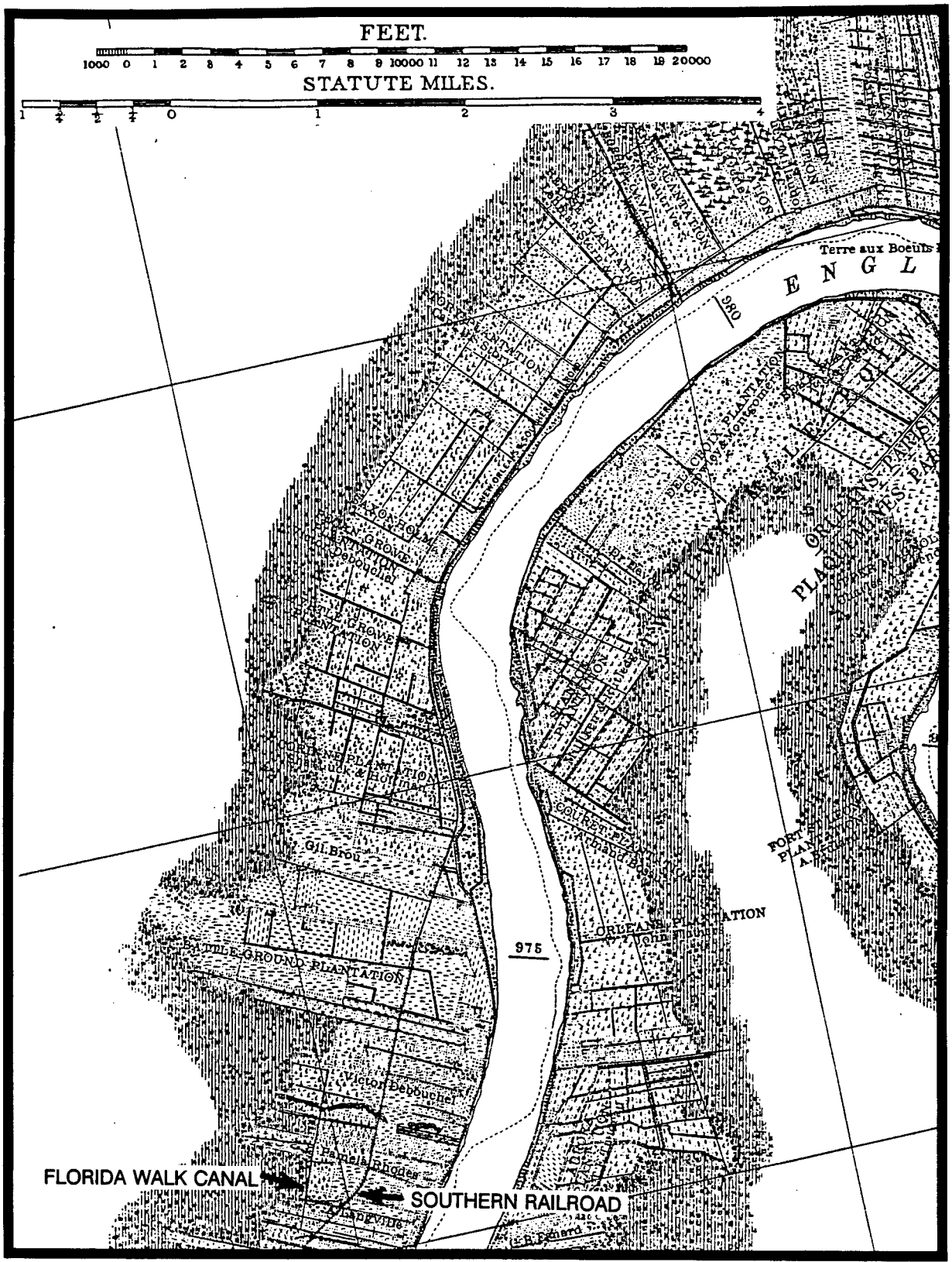

Figure 12. An excerpt from Sheet 29, *Map of the Lower Mississippi River. . . .* 1895. Published by the Mississippi River Commission. Superimposed on the map, arrows indicate the Florida Walk Canal and Southern Railroad.

was extended much farther. By the Civil War, the railroad had been extended to 45.1 km (28 mi) and ran from New Orleans to Proctorville, but the line remained in perpetual financial distress. Iron became so scarce during the war that in late 1861 the company proposed to tear up its track and sell the rails to the Confederacy. Assessing the offer as profiteering rather than patriotism, the State of Louisiana refused permission. Thwarted, the railroad made no contribution whatsoever to Confederate attempts to defend New Orleans. In fact, during the war, passengers complained that it took a week to travel the 28 miles to Proctorville because the cars kept running off the track (Estaville 1989:99-103).

At the close of the Civil War, a special committee of the state legislature investigated the Mexican and Gulf Railroad and found that its tracks and its rolling stock were unfit for use, that sparks from its trains were "constantly setting fire to houses, barns, fences and crops," and that the line was dangerous to life and limb (Walker 1866:3-4). The legislature liquidated the company, and the Mexican and Gulf Railroad went out of business. As one historian has remarked, "The Mexican Gulf venture must be written off as a total loss except to a few plantation owners east of the city" (Reed 1966:43). By 1874, the New Orleans and Southern Railroad had assumed use of the tracks; the Southern Railroad continues to operate this route (Figure 12).

The Project Area during the Battle of New Orleans, 1815

Commentators refer to the American defensive position in the Battle of New Orleans as the Line Jackson (for the American military commander) or the Chalmette line, for Ignace Matin de Lino de Chalmette, who owned the plantation located immediately downriver from the American fortifications. Following the route of an abandoned canal on the Manuel Rodriguez Plantation (just below the Macarty Plantation), the Line Jackson ran fairly straight from the river to an unnamed cypress swamp. Where it reached the swamp, however, the line made a 90 degree turn upriver. According to Maj. A. Lacarrière Latour, an eyewitness to the battle, "enormous holes in the soil made impassable by their being full of water from the canal, rendered this bend in the line unavoidable" (Latour 1964:149).

Powell Casey, an authority on military fortifications, places this American defensive line in Section 21, T13S, R13E (Casey 1983:40). Cypress swamp enveloped the project area, which fell behind the American line in Sections 50, 64, and 76, T12S, R13E. Because the American line held so firmly and repelled the British attack, the battle did not have an impact on the acreage currently known as the Meraux Tract.

Participants in the Battle of New Orleans have left varying descriptions of the Line Jackson, some of which are described briefly below. Even eyewitnesses to the struggle disagree on some details of the American defensive position. Further controversy surrounds the extent of erosion of the Line Jackson through the years. Encroachment by the river unquestionably has shortened the line, but authorities differ on the extent of the loss (Hinks 1991:3; Hinks et al. 1991:9-12).

<u>Accounts of Line Jackson: Maj. Gen. John Lambert, Commanding Officer, British Forces, January 10, 1815</u>

Reporting to London two days after the Battle of New Orleans, General Lambert, who assumed command after the death of Gen. E. M. Pakenham, described the Line Jackson in the following words: "On the left bank of the river it was simply a straight line of a front of about one thousand yards, with a parapet, the right resting on the river and the left on a wood, which had been rendered impracticable for any body of troops to pass" (Latour 1964:Appendix cxlix). His testimony suggests that the cypress swamp and the American troops who patrolled it effectively prevented the British from attempting a movement around the American left flank into the project area. According to Lambert, the Line Jackson ran for only about 915 m (3,000 ft). He may not have been aware of the extension of the line into the swamp.

Accounts of Line Jackson: Capt. H. D. Jones, Royal Engineers, March 30, 1815

After the ratification of the peace treaty, the British authorities sent Capt. H. D. Jones, Royal Engineers, to survey the battlefield and to inspect the American defensive position. He reported:

> From the river to within 150 yards of the woods, the line [Jackson] is straight. Here an inverted redan was made, the faces of which were about 40 yards in length. The line then continued into the woods for 400 yards and then makes a return to the rear at right angles for 100 yards. The breast works in the woods were made of trees with loop holes. The woods were cleared to the rear of the breastworks for about 50 yards (Casey 1963:72 quoting Jones).

Powell Casey has accepted the testimony of Captain Jones that indicates that the American defensive line ran 400 yards into the woods before it turned upriver for an additional 100 yards (Casey 1983:40). Other historians use different calculations to describe the left side of the American line.

Accounts of Line Jackson: Andrew Jackson's Version, 1817

Acutely conscious that the Battle of New Orleans established his place in history, Andrew Jackson on June 12, 1815, asked Edward Livingston, his aide, to arrange for the measurement of the main line. Two years later, on July 23, 1817, Jackson reported that the line extended approximately 1,400 m (1,527 yds). According to Jackson, a brigade commanded by Gen. John Coffee occupied the approximately 561 m (613 yds) to the left of the line (Casey 1963:73). While Powell Casey accepts the measurements reported by Jackson (Casey 1983:40), others accept the measurements described by Maj. Lacarrière Latour.

Accounts of Line Jackson: Maj. A. Lacarrière Latour, 1817

Major Latour served as a military engineer for Jackson, observed the battle as an eyewitness, and recorded the event for posterity (Latour 1964). Latour also provided a scaled map of the battlefield: *Plan of the Attack and Defence of the American Lines below New Orleans on the 8th January 1815* (1817). As depicted by Latour, the line actually ran for approximately 1,510 m (1,650 yds) rather than the 1,400 m (1,527 yds) that Andrew Jackson claimed. Furthermore, Latour indicated that the line turned upriver for approximately 183 m (200 yds) rather than the 91.4 m (100 yds) that Captain Jones, Royal Engineers, described.

Historians use the Latour book and map more than any other primary source to describe the struggle of January 8, 1815. In consequence, his depiction of the Line Jackson serves as the basis for most historical accounts of the American defensive position. For example, Jane Lucas de Grummond describes the Line Jackson as extending 640 m (700 yds) on solid ground, 686 m (750 yds) through the woods and swamps, and, after a 90 degree turn, an additional 183 m (200 yds) upriver (de Grummond 1979:125). Other historians, such as Frank Lawrence Owsley, Jr., also accept the Latour measurement of the Line Jackson at 1,510 m (1,650 yds) (Owsley 1981:158).

The Position of General Coffee on Line Jackson

Gen. John Coffee commanded the troops, mostly Tennesseans, who defended the swampy left end of the Line Jackson. From December 24, 1814, to January 20, 1815, the Tennesseans marched through mud. Major Latour described the situation:

> From this bend, where the wood began, to the extremity of the line, the ground was so low, and so difficult to be drained, that the troops were literally encamped in the water, walking knee deep in mud; and the several tents were pitched on small isles or hillocks, surrounded with water or mud. . . . Though constantly living, and even sleeping, in the mud, those worthy sons of Columbia [Coffee's troops] never uttered a complaint, nor showed the lest [*sic*] symptom of discontent or impatience. Those who have not seen the ground, cannot form an idea of the deplorable condition of the troops encamped on the left of the line. But it was necessary to guard that quarter against the attacks of the enemy; it was necessary that troops should be stationed there, to repulse [the enemy] on the edge of the breastwork, if, under cover of the bushes, he advanced to our intrenchments [*sic*] (Latour 1964:149).

Accounts of the number of men under the command of Coffee vary from 500 to 1,200 (Latour 1964:151; Owsley 1981:158). A very small group of Choctaws, who served effectively as scouts, also fought alongside the Tennesseans.

The Artillery Duel of January 1, 1815

On December 28, 1814, the British erected a battery of two guns downriver from the American position on a road that ran just inside the levee. Four days later, on New Year's Day, 1815, the Redcoats moved artillery into the field before the Line Jackson. Two British batteries with eight guns commandeered a position opposite the right of the American line (close to the river), and two more Redcoat batteries totalling eight guns moved into place facing the center of the Line Jackson. At eight o'clock in the morning, the British began a bombardment. The American batteries responded, and an artillery duel ensued. The British directed most of their fire to the right and center of the American line. The left of the Line Jackson, which protected the approach to the project area, received little shelling. According to Latour:

> The first discharges of the two batteries nearest the river, were principally directed against Macarty's house, where the headquarters were established. In less than ten minutes, upwards of one hundred balls, rockets and shell struck the house, and rendered it impossible to remain there. The general-in-chief and all his staff were in the apartments when the firing began; but though bricks, splinters of wood and furniture, rockets and balls, were flying in all directions, not a single person was wounded (Latour 1964:132).

According to Latour, as the British bombardment continued about ten o'clock:

> . . . the enemy ordered some platoons of sharp-shooters to penetrate into the woods on the left of our line, with a view to ascertain whether it could be turned; but he soon perceived, from the brisk fire of our musketry, that on the left we were as well prepared to receive him as on the right. . . . Wellington's heroes discovered that they were ill qualified

> to contend with us in woods, where they must fight knee deep in water and mud, and that the various kinds of laurel which abound in Louisiana, in the cypress swamps and prairies, were not intended to grace their brows. . . . But on the other hand, cypress trees are still more common . . . the emblem of the disasters which will ever attend the invaders of that country (Latour 1964:134-135).

The British abandoned their attempt to turn the left of the line, and their artillery fire slackened by noon. Continuing to fire, the American artillery by the close of the day forced the British to withdraw from the field. An American scouting party later discovered:

> The [British] batteries had been dismantled during the night, and with much difficulty their guns were removed, by being dragged through the mud.
>
> On the 2d, early in the morning, several parties went out to view the enemy's batteries, where they found some barrels of powder, a large quantity of cannon balls and implements of artillery, with broken gun-carriages belonging to the navy, and carronades which our balls had shattered (Latour 1964:137-138).

The Americans won the artillery duel of January 1, 1815.

The Battle of January 8, 1815

On the night of January 7, the British once more moved two batteries with eight guns into position near the river, but the Redcoats did not remount the battery of eight guns that stood before the center of the Line Jackson on January 1. On January 8, as the sun rose and the fog cleared, the Americans saw the full force of the British army advancing upon them.

The center of the Line Jackson bore the brunt of the British attack, but the Redcoats tested the left of the American defensive position. As one observer of the battle recorded:

> Some of the enemy's troops had advanced into the wood towards the extremity of our line, to make a false attack, or to ascertain whether a real one were practicable. There the troops under general Coffee no sooner perceived, than they opened on them a brisk fire with their rifles, which quickly made them retire. The greater part of those who, on the column's being repulsed, had taken shelter in the thickets, only escaped our batteries to be killed by our musketry. During the whole hour that the attack lasted, our fire did not slacken for a single moment; and it seemed as though the artillery and musketry vied with each other in vivacity (Latour 1964:156-157).

Describing the attack on the left of the Line Jackson, Andrew Jackson wrote:

> Reasoning always from false principles, they [the British] expected little opposition from men whose officers even were not in uniform, who were ignorant of the rules of dress, and who had never been caned into discipline – fatal mistake! a fire incessantly kept up, directed with calmness and with unerring aim, strewed the field with the bravest officers and men of the column which slowly advanced, according to the most approved rules of

European tactics, and was cut down by the untutored courage of American militia (Latour 1964:clxxxiii-clxxxiv).

During the feint to the left of the Line Jackson, the British sent a secondary column advancing along the road inside the levee. Although a few Redcoats temporarily penetrated the American position, they lost their lives in the assault. In the meantime, American artillerymen and sharpshooters ravaged the British, who concentrated their attack on the center, the strongest point of the Line Jackson. A Kentucky militiaman looked out over the field about 8:30 a.m., January 8, and later wrote:

> When the smoke had cleared away and we could obtain a fair view of the field, it looked, at the first glance, like a sea of blood. It was not blood itself which gave it this appearance but the red coats in which the British soldiers were dressed. . . . [T]he field was entirely covered [by] prostrate bodies. In some places they were laying in piles . . . one on top of the other. On either side, there was an interval more thinly sprinkled with the slain: and then two other dense rows, one near the levee and the other towards the swamp. About two hundred yards off, directly in front of our position, lay a large dapple gray horse, which we understood to have been Pakenham's [the British commanding general] (Owsley 1981:128).

The British suffered heavy casualties, including the death of two generals. Casualties associated with the January 8 attack included 292 soldiers killed, 1,262 British wounded, and 484 soldiers captured. When the smoke from the battle cleared, numerous British soldiers startled the Americans by rising up from the heaps of dead men on the field, coming forward to the American lines, and surrendering. The scene suggested to Andrew Jackson, in his words, a "grand and awful" harbinger of the biblical Resurrection of the Dead (Owsley 1981:162).

Impact of the British Invasion on the Project Area, 1814 - 1815

The British invasion of Louisiana and the Battle of New Orleans had no appreciable impact on the project area. Enveloped in woods and cypress swamp, the project area fell behind the American lines and served as neither a staging area nor as a defensive position. Sharpshooters under the command of General Coffee, as well as the swamp and the density of the undergrowth, discouraged the British from attacking around the left side of the American line; an attack from the left would have brought conflict to the project area. British artillery fire concentrated on the center and right of the Line Jackson. It is unlikely that any shot or shell ever reached the project area. In summation, it is unlikely that any cultural resources related to the Battle of New Orleans fall within the current project area.

Impact of Recent Development on the Project Area

During the twentieth century, various businesses developed throughout portions of the project area. For example, around 1941, a rifle range served the community, a drive-in theater was constructed in early 1949, and around 1950, an airport with one runway was in operation. In addition, a miniature golf course was situated adjacent to the site, beginning in the late 1950s. Judge Perez Boulevard, which cuts through the project area, dates from the 1960s. With regard to cultural resources, the various businesses along that thoroughfare should have had minimal impact on the project area. In summary, little if any historical cultural resources should be present within the Meraux Tract project area.

CHAPTER VI

RESEARCH DESIGN AND RECOMMENDATIONS

Research Design

The majority of the Meraux Tract project area extends parallel to the eastern side of the Guerenger Canal. This portion of the tract is characterized by dense undergrowth, is heavily wooded, consists of drained backswamp, and is undeveloped. In contrast, an area of approximately 150 linear m (500 linear ft), located immediately south of Patricia Street, is only lightly wooded. The remainder of the Meraux Tract, a narrow strip of land located between the Florida Walk Canal and the Back Protection Levee, consists of drained backswamp that may have been built up with dredged material from the adjacent pond located to the immediate north.

Although the project area consisted of only undeveloped cypress swamp throughout much of its history, it formed the hinterlands of both the Languille and Macarty plantations, plantations that figured significantly in the Battle of New Orleans in 1815. The Languille plantation served as a staging area for some of the American troops engaged in the fighting, and on the Macarty Plantation, Maj. Gen. Andrew Jackson established his headquarters in a now-demolished mansion near the river. Neither the staging area nor the mansion lay within the project area. Official maps prepared by both the Americans and British refer to an "impenetrable" cypress swamp enveloping the project area.

Expectations for Prehistoric Sites within the Project Area

Prehistoric archeological expectations are tied closely to the geomorphic development of the project area vicinity. The known development of the area indicates three general periods during which prehistoric occupation of the project area could have occurred. Paleo-Indian and Early Archaic cultural resources may lie at the top of the underlying Prairie Complex, at approximately 18 to 22 m (59 to 72 ft) below modern sea level. Rising sea levels during the Middle and Late Archaic inundated the project area, precluding prehistoric occupation of the area. The subsequent progradation of the St. Bernard Delta Complex, approximately 3400 - 1600 B.P., covered the inundated Prairie Complex and developed the project area vicinity. Archeological deposits that may be associated with the St. Bernard Delta Complex probably are buried at least 5 m (16.4 ft) below the modern ground surface. These deposits have been modified and partially covered by Meander Belt No. 1, which constitutes the current course of the Mississippi River. Archeological deposits associated with Meander Belt No. 1 would lie within the upper approximately 2 m (6.6 ft) of the ground surface. If present, Native American remains in these upper deposits would date from the transitional Coles Creek and Plaquemine cultures.

Based on known prehistoric settlement patterns, few if any Native American archeological deposits are anticipated in the near-surface deposits of the project area. Most if not all of the area consists of drained inland swamp deposits, a terrain feature that is not conducive to long-term occupation. The *Soils Survey of St. Bernard Parish* provides no indication that any crevasse splays, former distributaries, or subsided natural levees extend through the project area. In addition, very few Native American sites have been found in backswamp environments except for those sites located on submerged natural levees or along current or former shorelines (see Chapter III). Based on the geomorphic setting of the project area, it is anticipated that no Native American sites will be located within the project area.

Historic Sources Consulted in the Investigation

Historic maps provide a valuable source for reconstructing the historic development of the Meraux Tract. The following maps proved especially useful:

1) *Carte Particuliere du Flevue* [sic] *St. Louis* (1723);

2) A. Lacarrière Latour, *Plan of the Attack and Defence of the American Lines below New Orleans on the 8th January 1815* (1817);

3) Charles Zimpel, *Topographical Map of New Orleans and Its Vicinity* (1834);

4) Department of the Gulf Map No. 5 (prepared for General Nathaniel P. Banks), *Approaches to New Orleans* (1863);

5) Mississippi River Commission, Chart #76, *A Survey of the Mississippi River* (1874);

6) Mississippi River Commission, sheets 28 and 29, *A Survey of the Mississippi River* (1895,1896).

Among the more important primary sources utilized in studying the Meraux Tract was the *Historical Memoir of the War in West Florida and Louisiana in 1814-1815*, written by Maj. A. Lacarrière Latour, an American military engineer who participated in the battle. Other valuable primary sources included the Population Schedules, United States Bureau of the Census, and the conveyance books and other public records of St. Bernard Parish. Among the myriad secondary sources examined, one monograph in particular provided exceptionally well-researched and detailed information: *Plantation Houses on the Battlefield of New Orleans*, by Samuel Wilson, Jr. (1965).

Expectations for Historic Sites within the Project Area

An examination of sources from the eighteenth and nineteenth centuries provided no evidence of habitation, agricultural production, or military activity in the project area. During the Battle of New Orleans, a cypress swamp enveloped the project area; the cypress swamp continued to cover the project area throughout the Civil War. The tracks of the financially unsuccessful Mexican and Gulf Railroad, begun in 1837, ran just below the swamp (and outside of the project area). The 1874 and 1895 - 1896 Mississippi River Commission charts indicate no cultivation of crops in the project area. When Louis Anthony Meraux and Albert Sidney Nunez bought the project area in 1925, conveyance records indicated no improvements had been made on the acreage. The St. Bernard Drive-In Theater, built in 1949, was the first recorded commercial enterprise in the project area. The theater went out of business and was razed between 1991 and 1993; only a chain-link fence positioned beside the Guerenger Canal indicates the former location of the theater.

The following businesses currently are situated in the project area on the northern (lake) side of Judge Perez Boulevard: Moon's St. Bernard Tire Service (7701 Judge Perez); Arabi Wholesale Used Cars (7703 Judge Perez); Boyd Breaux's Marine Engine Service (7713 Judge Perez); and an unidentified structure, possibly an abandoned residence (7717 Judge Perez). The following commercial enterprises are located on the south (river) side of Judge Perez, adjacent to and east of Guerenger Canal: Bodyshop, Inc. (7710 Judge Perez); Pepe's Lounge (7714 Judge Perez); and the recently constructed Finish Line Off Track Betting Parlor (7718 Judge Perez), with a parking lot that could accommodate approximately 200 vehicles.

Archeological Recommendations

As noted above, few if any artifacts or features from the Battle of New Orleans nor any cultural resources connected with plantation agriculture along the lower Mississippi River should be located in the project area. No known improvements were made at the site until the second half of the twentieth century; therefore, historic cultural resources should date only from the very recent past.

Few if any prehistoric archeological resources are anticipated in the project area. A review of the *Soil Survey of St. Bernard Parish* and a comparison of the soils and landforms found throughout the project area with soils and landforms associated with known site locations in backswamp settings in Orleans and St. Bernard parishes supports such a conclusion. However, no groundtruthing of the *Soil Survey* has been performed, and it is conceivable that minor variants of landforms that have proven supportive to human habitation do exist unrecorded in the project area.

Therefore, a limited reconnaissance survey consisting of visual inspection and judgmental shovel and auger testing is recommended to assess the potential of the project area to contain landform suitable for cultural settlement. First, a visual reconnaissance of the entire project area is recommended. The property should be examined for any anomalous landforms or surface expressions and/or exposures of prehistoric or historic sites. In addition, the southern half of the project area should be stratified according to the presence or absence of natural Mississippi River levee deposits. This task may be achieved by examination of a series of auger or oakfield probe tests by a qualified geologist/geomorphologist. Approximately 10 soil probes should be excavated at 100 m (328 ft) intervals along the long axis of the project area and parallel to the Guerenger Canal between St. Bernard Highway and Judge Perez Boulevard. Finally, a series of 20 judgmentally placed shovel/auger tests should be excavated within the area determined by the soils analysis to contain levee deposits. It is recommended that these tests consist of a 30 x 30 cm (11.8 x 11.8 in) shovel tests excavated to a depth of 50 cm (19.7 in) below surface followed by the excavation of an auger test from 50 to 100 cm (19.7 to 39.4 in) below surface. The shovel testing will allow for the collection of any near-surface cultural material, while auger testing could encounter more deeply buried shell middens.

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PERSONAL COMMUNICATION

Fulcher, Jewel
September 21, 1994

Gillen, Jerry
September 26, 1994

APPENDIX I

SCOPE OF SERVICES

19 May 94

SCOPE OF SERVICES

Research Design for a Detour Route for a New Lock,
Orleans Parish, Louisiana

1. Introduction. The U.S. Army Corps of Engineers, New Orleans District (NOD), is planing improvements to the Inner Harbor Navigation Canal Lock in Orleans Parish. The plan could lead to replacement or renovation of the Lock and bridge construction at the sites of the St. Claude and Claiborne Avenue bridges. The purpose of this delivery order is to develop a research design to locate and evaluate cultural resources in a detour route in the Mereux tract to be used during bridge construction. One area for investigation is a 1000 foot wide tract along the Guerenger Canal. A second area is located between the Walk Canal and the back protection levee. The project area is shown on the enclosed map.

2. Study Requirements

The work will be divided into two phases:

(1) Background research, and
(2) development a research design.

Phase 1. Background Research

The study will begin with research in the available literature and records to predict the nature of the resource base in the project area. This background research will include a literature review, review of the geomorphology, and research in historical records to develop a historical overview. The purpose of the background research is to reconstruct the prehistoric and historic use of the study area and develop a historic context to be used in further investigations. Historical maps and aerial imagery will be consulted to assist in the location of historic properties. No field work is necessary for this project.

Phase 2. Development of a Research Design

The Contractor shall synthesize all pertinent data and prepare a research design for the cultural resources effort required for Corps of Engineers work in the area.

The research design shall include:

1. a comprehensive synthesis of all data gathered in Phase 1. Each site identified in the area will be fully discussed,

2. a detailed narrative and graphic presentation of archeological expectations for the study area including prediction of any sites that may exist in the project area,

3. description of the historic context to provide a framework for the sites identified in the area. This discussion will establish the framework for future assessment of the National Register eligibility of sites in the area,

4. and detailed field methodology for intensive survey and testing of the archeological potential of the area. The proposed methodology will be sufficiently detailed to implement future cultural resources investigations for this project. Graphics should be used as necessary to enhance the clarity of the methodology.

3. Reports

Five copies of the draft report integrating all phases of this investigation will be submitted to the COR for review and comment within 10 weeks after work item award.

The written report shall follow the format set forth in MIL-STD-847A with the following exceptions: (1) separate, soft, durable, wrap-around covers will be used instead of self covers; (2) page size shall be 8-1/2 x 11 inches with 1-inch margins; (3) the reference format of American Antiquity will be used. Spelling shall be in accordance with the U.S. Government Printing Office Style Manual dated January 1973.

The COR will provide all review comments to the Contractor within 6 weeks after receipt of the draft reports (16 weeks after delivery order award). Upon receipt of the review comments on the draft report, the Contractor shall incorporate or resolve all comments and submit one preliminary copy of the final report to the COR within 3 weeks (19 weeks after delivery order award). Upon approval of the preliminary final report by the COR, the Contractor will submit 30 copies and one reproducible master copy of the final report to the COR within 20 weeks after delivery order award. In addition, computer disks containing files of the report will be submitted to the COR.

4. References

The study will be conducted utilizing current professional standards and guidelines including, but not limited to:

1. the National Park Service's draft standards entitled, "How to Apply the National Register Criteria for Evaluation," dated June 1, 1982;

2. the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation as published in the Federal Register on September 29, 1983;

3. Louisiana's Comprehensive Archeological Plan dated October 1, 1983;

4. The Advisory Council on Historic Preservation's regulation 36 CFR Part 800 entitled, "Protection of Historic Properties."